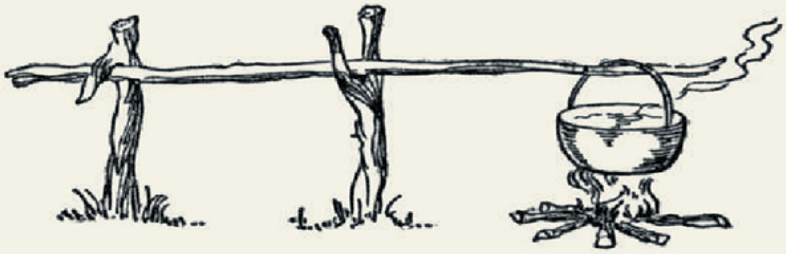

The BUSH CRAFT

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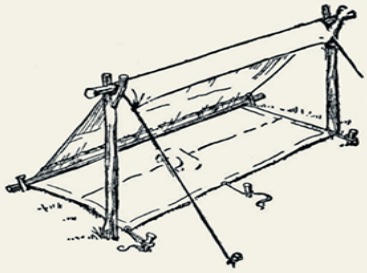
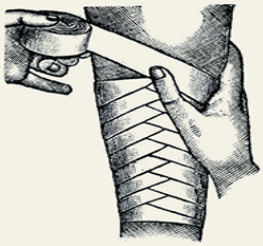
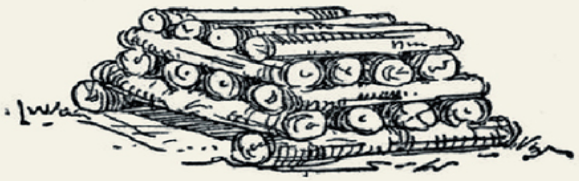
BUSHCRAFT 101 | **ADVANCED BUSHCRAFT** |
THE BUSHCRAFT FIELD GUIDE TO TRAPPING, GATHERING, & COOKING IN THE WILD | **BUSHCRAFT FIRST AID**

Dave Canterbury
with Jason A. Hunt, PhD

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BUSH CRAFT 101

A Field Guide to the Art of WILDERNESS SURVIVAL

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DEDICATION

I would like to dedicate this work to all the frontiersmen and woodsmen who came before me who have passed on their knowledge through their writings and journals. Without these individuals we would not have so much information from which to glean our current knowledge, and without their dedication books like this one would be impossible.

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Introduction

“Preconceived notions, especially when one is fairly brought up in their influence, are most difficult to shake off.”

STEWART EDWARD WHITE, *CAMP AND TRAIL*, 1907

“Bushcraft” is a term for wilderness skills and is the practice of surviving and thriving in the natural world. To effectively practice bushcraft, you must master a unique skill set that includes firecraft, navigation, trapping, creating shelter, tracking, and the use of tools, both modern and primitive. Wise hikers carry few essentials and tools with them on their journeys; instead of extra equipment, they carry the knowledge and skills needed to create necessary items straight from the landscape. To thrive in the woods without the modern comforts available today takes determination. Like any hobby, it requires dedication and knowledge that may in certain circumstances save your life. Many bushcrafting skills are essential to surviving in the wild in an emergency.

Turning to the not-so-distant past, you’ll find that some of the most influential men in history took life in the wilderness as a serious endeavor as well as a euphoric pastime. They reconnected with nature, conserved resources, and worked to preserve the natural world. Theodore Roosevelt is perhaps the most famous president associated with exploration, preservation, and life in the wild. Working with John Muir, founder of the Sierra Club, he improved the protection of the United States’ natural wonders, preserving 230 million acres of wildlife habitat across the nation.

Within thirty years of the turn of the twentieth century, folks in the United States were rediscovering what it was like to spend time in nature and finding a release from the day-to-day life. Writers and authors such as Horace Kephart and E.H. Kreps captured this new craze by using the terms “woodcraft” and “camping.” They followed in the footsteps of their predecessors such as George Washington Sears “Nessmuk,” who was an innovator in tramping and traveling in the woods for recreation—not survival. More recently, Les Hiddins, the Australian “Bush Tucker Man,” Mors Kochanski, the Canadian bushcraft and survival instructor, and Ray Mears, the famous English woodsman and instructor, have all brought the practice of bushcraft to contemporary audiences.

Why would anyone, in this era of modern conveniences and incredible technology, leave a comfortable life behind in pursuit of a simpler, but potentially hazardous, tramp in the woods? The reasons are many, and the benefits are numerous. Practicing bushcraft is a great way for you to enjoy the outdoors. If you feel you’re trapped in an urban environment, a good tramp is a way to return to the wild, turn off your electronic devices, and escape society’s constant pressures. In addition, the abilities you hone in the bush can become lifesaving skills when it comes to disaster preparedness and survival situations.

Nessmuk said it best when he explained, “We do not go to the green woods and crystal waters to rough it, we go to smooth it.” That is a powerful statement, especially in this day of modern convenience. Many believe that to “smooth it,” or to be comfortable, means that we need lots of gear and gadgets. In reality, you need very little equipment to succeed in the wild. Instead, you need knowledge of the natural world. This book gives you that knowledge in a short span of words, but it must be complemented

by your own experience and time in the bush to gain your own “Doctorate in Woodsy Knowledge” (a term coined by Mark Baker).

This volume is the perfect companion for outdoor enthusiasts as well as those new to practicing bushcraft. It was written from personal experience, research, and many days and nights afield within several different environments and ecosystems. Guided by my experience, you’ll discover all you’ll need for expeditions, from preparing your pack to setting up camp to choosing tools and supplies. This handbook also includes clear instructions on navigating, fire-making, trapping, fishing, foraging, and more. You’ll even learn the best ways to conserve resources, both natural and man-made. The tried-and-true instructions, tips, and tricks found here will give you the important bushcrafting skills you need to transition from indoor living to surviving—and thriving—in the natural world.

It is my belief that by understanding natural resources and learning about the items that make the difference between comfort and misery, you can attain an almost euphoric experience when spending time on the trail or in the bush. With this book as your guide, soon you’ll be enjoying the wilderness as well—without the need to smooth it. To that end, I present this writing to you, inspired by my heroes and mentors of the past as reclamation and a more contemporary version of bushcraft from my experience in the eastern United States.

—Dave Canterbury

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PART 1
Gearing Up

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Chapter 1
YOUR PACK

"The man, who goes afoot, prepared to camp anywhere and in any weather, is the most independent fellow on earth."

—HORACE KEPHART, 1904

When you practice bushcraft, you are a self-contained unit: You must carry all you need on your back and on your person, everything necessary to sustain you for the duration of your trip. (You must also include anything you may need in an emergency.)

THE FIVE Cs

You can organize the essentials based on the **Five Cs of Survivability**. Within these five base elements are all the tools and knowledge you need to be prepared for emergencies as well as to become independent of the trappings of the urban jungle. These items are the hardest to reproduce from natural material, take the largest amount of skill to reproduce, and control the conditions that most directly affect your body's core temperature. (They can also be used to process raw items to help control your body's core temperature.) These items, along with your ability to dress for the current conditions and knowledge of the natural world, make it easy to pack a light kit and enjoy your time "afoot."

The Five Cs are:

Cutting tools to manufacture needed items and process food
Cover elements to create a microclimate of protection from the elements
Combustion devices for creating the fires needed not only to preserve and cook food, but also to make medicines and provide needed warmth
Containers to carry water over distances or to protect collected food sources
Cordages for bindings and lashing

These items, along with knowledge of the landscape and a few items to secure your food, will be the core of what you pack and carry. You can then add a few things for first aid, navigation, and repair to make your life "smooth" while on the trail and in camp. Does that mean you need a plethora of items that will be miserable to carry or will be so cumbersome as to make you regret the trip within a few hundred yards? No; rather you must choose the right elements for your kit, and you must ensure that these items are of the best quality. In addition, you must make sure that they will perform several needed tasks well.

CORE TEMPERATURE CONTROL, COMFORT, AND CONVENIENCE

The Five Cs are largely intended to help you control your core temperature, comfort, and convenience. When packing or creating your kit, understanding these elements will help determine which items are truly important and which are only added weight. Your first priority in any kit is to maintain your bodily functions and core temperature in any weather condition. For this reason, items such as combustion devices, clothing, and

containers to process water will be of the utmost importance. If you look at comfort, these are the items that you will want to provide a comfortable night's sleep. Sleeping at least four solid hours per night is crucial to enjoying your time afoot. (You can gauge someone's experience level in the woods by how well he or she sleeps at night.) Convenience items are those that you don't have to pack but you would like to bring along to make things enjoyable or to make some tasks a bit easier. By focusing on core temperature control and comfort when planning your packing, you will make room for convenience items that make for memorable times in the wild.

PACKS: AN OVERVIEW

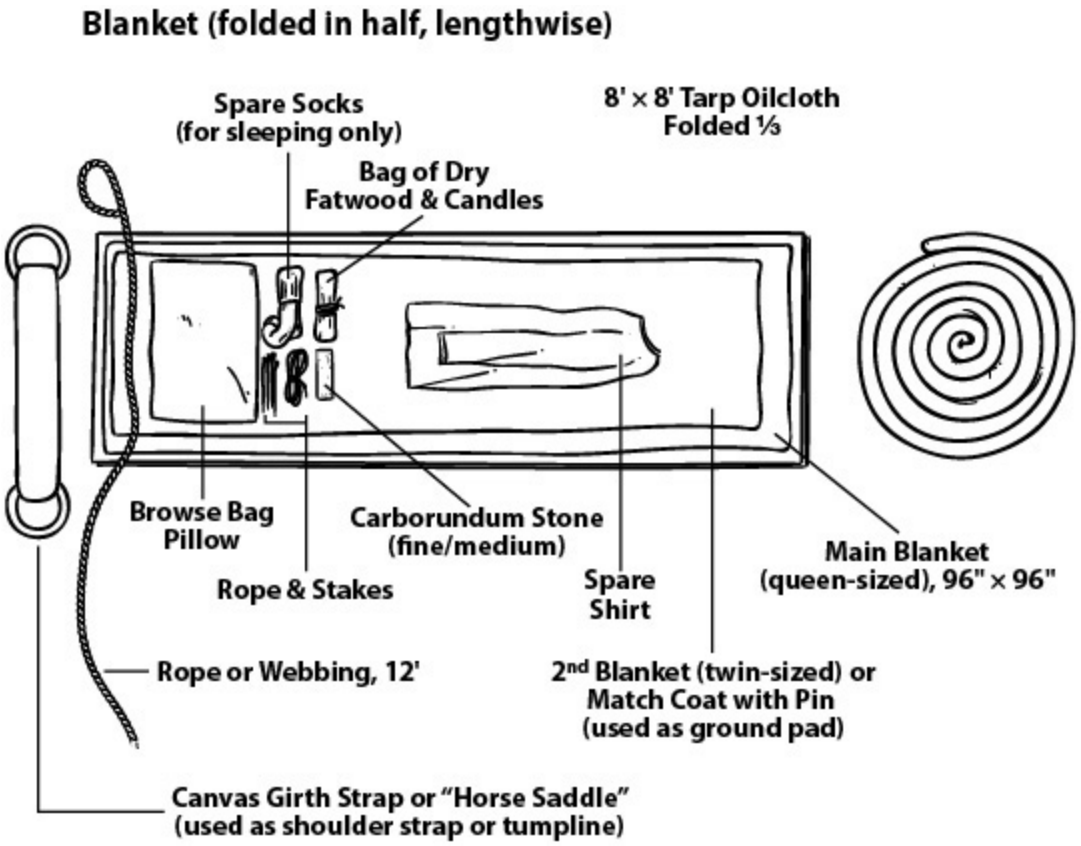
Now that you know the philosophy of packing, you need something in which to carry your gear. There are many different packing configurations and brands on the market today, and the choices in colors and style are almost endless. I have never been a fan of packs with lots of pockets and compartments; whenever you look for a certain item, finding it becomes an ordeal. Keep things simple; our mentors of the past believed the same. The most basic carry means a **bed/blanket roll**, **rucksack**, **pack frame**, or **pack basket**. Some of these can be combined for further comfort or versatility. In the following sections, we'll consider a few improvised strategies for packing, as well as some more common options available today.

CARRYING YOUR WOOL BLANKETS

If you plan to use a wool blanket and not a sleeping bag, you will need a queen-size 100 percent wool blanket and a twin-size 100 percent wool blanket combined for bedding; this will suffice in temperatures all the way

to freezing. To create this carry option, lay a **tarp** on the ground, folded in thirds (8' × 8' is a good minimum size). Then fold the queen blanket in half with the twin folded in half on top of that. To this you will add other elements of the kit that you won't immediately need, as they will be confined to this roll until you set camp. Spare clothing and some dry tinder are good things to put inside this roll for dry safekeeping.

Once the roll is laid out on the ground, fold in half a piece of rope or webbing of 12' length and place it at the end of the roll. Roll the rope up into the rest of the bedroll; when it's in the roll, a loop will extend from one side, and the two tails of the rope will extend from the other side of the roll. Feed these tails through the loop and tie them off. You will then need to strap the roll together by using two lengths of cordage around the outside of the roll, and knot them off. In this configuration, you can wear the roll as a single strap, or the rope can be divided to form a backpack-style carry.



Assembling your bedroll

RUCKSACKS

A **rucksack** is a common name for a backpack, and there are hundreds on the market today. Again, lots of pockets and compartments in a pack can create problems; stick with designs that feature a large bucket-style compartment and a couple of outside pockets for easy access to important or often-used items. A pack large enough to fit a pack basket, or about 35–50 liters, is more than large enough for many days in the field. The most important thing to remember when selecting a rucksack is the overall durability of the pack and all its component parts, such as straps, zips, and buckles. Canvas packs are great, but a heavy material (with a denier of 500+) will work as well. For the beginner, military surplus is a good place

to start. Military surplus materials have been tested to withstand much abuse, and if you inspect them, you'll usually find them to be in good order. They will serve you for many years at a very good price.

PACK BRANDS TO CONSIDER

When selecting a new pack for purchase, be sure the company has a good reputation and long-standing experience in producing packs. Remember: Your pack is your lifeline when you're off in the woods by yourself. A lifetime guarantee is money well spent. Duluth Pack Company has been in business since the late 1800s, and today holds to the same quality and guarantee as the company's creator. These packs are among the best if you choose a rucksack option. As far as surplus packs go, Swedish mountain rucksacks, U.S. ALICE (All-Purpose Lightweight Individual Carrying Equipment) packs, and USMC ILBE (Improved Load Bearing Equipment) packs are difficult to beat for time-tested durability.

Any pack system should include a waterproof bag large enough to fill the main compartment to ensure that contents are kept dry—no matter the conditions. After you've set up camp, you can remove the bag and use the emptied pack for gathering camp resources such as firewood. If you want to combine a rucksack with a bed/blanket roll option, the pack can be of smaller size; simply adding "D" rings from any saddle shop will allow the roll to be hung from the straps at waist level. Many of the packs and frames available include a waist belt that is padded to help distribute the load, and most can be removed if you find they are in the way or if you want a lighter load.

PACK FRAMES

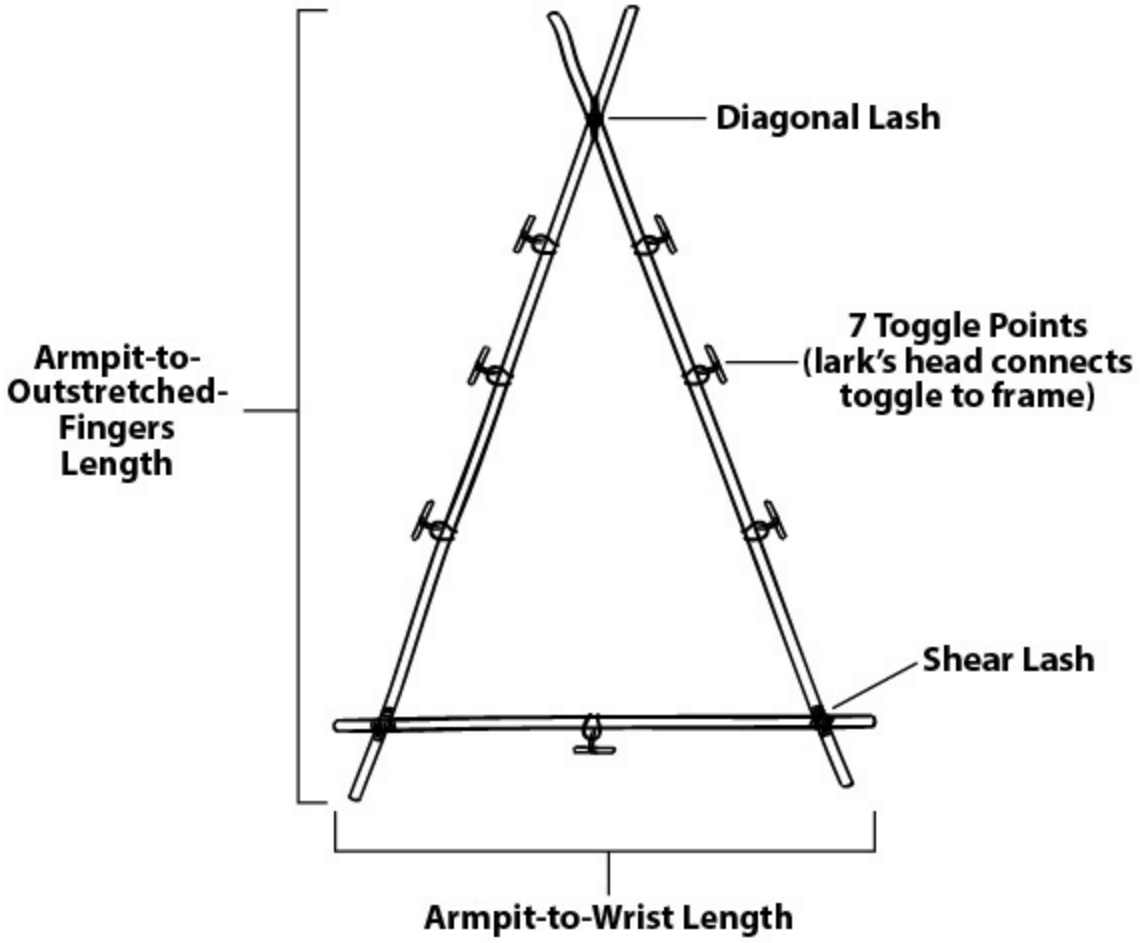
Pack frames are my favorite system for carrying gear into the field. You can use them as a standalone item or combine them with other items. The versatility of external frames has been all but forgotten today. The most popular improvised frame today is the **Roycroft frame**, named after Tom Roycroft, an outdoorsman who taught the construction of this type frame to Mors Kochanski, the famous Canadian bushcraft and wilderness survival expert. This simple triangle can be constructed within minutes and can last many years if the lashings are correct and the wood selection is wise. To create this type of frame, first cut three components (easily made from a single hardwood sapling), and follow these lashing instructions:

Cut a lumbar slat or split piece of hardwood approximately 2" wider than the lumbar region of your back (or about the length of your armpit to your wrist).

Cut 2 pieces 1–1½ times the length of your arm from armpit to outstretched fingertips.

Shear lash (See Chapter 3) both longer components about 1" in from the ends of the lumbar slat, and then cross and diagonal lash them about 4" from the top to create a triangle.

Once the frame is complete, create 7 toggle points for tying gear to the frame. The strap for the frame is made from a 12' long single piece of rope or webbing by making a lark’s head knot passing through the top X of the frame. Then wrap the rope around the ears of the lumbar piece, tying around your waist to secure.



Roycroft frame

An advantage to this frame is that it does not have crossbars within the triangle frame, which would dig into your back. Other frame types with crossbars cause the pack's load to push through the frame and into the back, causing discomfort over time. To pack the Roycroft frame, you can use a similar method to making a bedroll. Again, use the tarp as the outermost component. Instead of rolling the gear up in the tarp, fold the tarp around the gear, ensuring that the last fold becomes a flap to shed water. Lash this to the frame using cordage in an X fashion, and tie it off with a jam knot or similar knot before adding straps and donning the pack.

Metal pack frames also come in many configurations and price points. A good cheap version (although a bit small for some things) is the surplus

ALICE pack frame; you can find these with a complete shoulder strap and lumbar pad with waist strap for around $30. The only addition you'll need in order to use this as a standalone frame, similar to the Roycroft, is a few toggles for lashing points. In some cases you can also find a detachable radio shelf for the bottom of this frame, adding to its versatility. You can also purchase new pack frames made of metal tubes from companies such as Cabela's or Bull-Pac. These are made to carry game animals killed in the field. These frames are larger than the average pack and are mostly of good quality, although I would suggest checking these types of frames for the quality of their buckles, straps, and connections before purchasing. For a new frame, it is hard to beat the BULL-PAC, made by the company of the same name. This frame was designed with game carry in mind, but it has some qualities most regular frames don't offer: lashing points built into the design, with heavy and rugged hardware and straps, as well as a shelf to hold a bedroll secure. This pack should last a lifetime, and it is very comfortable even with the heaviest of loads (and lightweight when empty). Adapting these frames with other systems is a very easy process; one only needs to lash the gear to the frame itself and go (as with a Roycroft frame). I use the Bull-Pac design frame and incorporate many different systems depending on the excursion. A standard office trash basket makes a great trapping basket when attached to the frame, and with a bedroll nested on the shelf, it is a perfect hunting/trapping combination. Its size is dictated by the pack frame itself.

PACK BASKETS

Pack baskets have been used for many years, starting with the fur trappers of the Hudson's Bay Company in the late 1600s. They generally come with pack straps attached and can be used by themselves as a pack or combined

with other things. You can slip your pack basket into a large rucksack to make it more comfortable to carry. The advantage of the pack basket is its rigidity: It’s easier to put things in and retrieve them later, and since the baskets are generally made from wood or woven from modern synthetics, they also drain well if anything you put in them is wet. Nonetheless, any gear placed into these baskets (other than trapping gear) should be placed in a waterproof bag, as with any pack.

In these packs you can carry metal traps, trap tools, and other gear without the chance of puncturing the canvas or other pack materials. When you combine a canvas pack outer shell, such as a Duluth Pack, an inner waterproof bag, and a pack basket, this becomes a very versatile system, providing three different carry options in one unit. You can set camp, remove the waterproof bag containing camp gear, remove the trap basket (a woven basket generally made from ash splits with added straps; it can be used as a pack) for use on a line while camped, and have the empty backpack to carry resources back to camp during short scouts for firewood, etc. All trapping components can be left in the pack basket, and any blood or mud from the trap line will be confined to the trap basket during use.

BUSHCRAFT TIP

A pack harness employs the removable strap system from a pack or frame to use with a load wrapped into a tarp or blanket. An example is a set of **ALICE pack straps** (widely available and very cheap when purchased through surplus stores). When used in conjunction with a wrapped load, such as a tarp and gear, the straps can be attached directly to the horizontal webbing or rope used to secure the package, thereby forming a simple but effective backpack.

TUMPLINES

Tumplines are straps attached to a heavier load (such as a pack or frame) that are worn across the forehead to assist in carrying the load. In the old days these were usually handwoven straps that were wider where they stretched over your forehead. Canoe enthusiasts of the twentieth century used tumplines many times to carry heavy backpacks from canoes when fording an area in which all gear and the canoe had to be transported from one navigable waterway to another (this is called “portaging”). An easy way to fashion a tumpline is to use the rope or webbing mentioned earlier and add a girth strap from a saddle between the lines. The girth strap is a padded strap for the girdle of a horse; this can be used as a padded shoulder strap tied in the middle of the tumpline from each end at the area to be used across the forehead. You can also repurpose this as a wider and more comfortable shoulder strap in conjunction with a bedroll. For the most part, in this day and age with the new designs of modern packs tumplines are unnecessary, but they can be useful when doing things in a more minimal fashion and trying to get the most from your gear. I can tell you that a

tumpline comes in very handy when trapping, since you may be carrying a basket filled with about 100 pounds of the day’s catch, in addition to your equipment. This alone makes its carry worthwhile if you’re planning to trap.

HAVERSACKS

A **haversack** is a small bag carried on one side of the body. The haversack has been a standard carry item since the days of the frontier. These bags vary in size between 11" × 18" and 24" square; the exact size, however, is a matter of personal preference. Construction is usually of cloth or leather. Many haversacks are waterresistant, made from oilcloth or handmade waxed canvas. This device is used to carry items that are of immediate importance or items you collect along the journey. Never overstuff this bag to the point that you have no more room, especially for things you find along the trail; you may need room to store quick tinder sources or bird’s nest material.

BUSHCRAFT TIP

Belt pouches, usually made of leather, are where the bushcrafter keeps his or her main fire kit and possibly a spare carving knife or jackknife. It is your wallet, so to speak, used to carry the most important items you may need, especially if you have left everything else behind at camp or if you lose your supplies. The size of this pouch is optional, but you don’t want it so big as to become cumbersome while moving about.

PERSONAL CARRY KIT FOR THE TRAVELER AFOOT

Once you've selected your pack (or packs) you must decide what to put in it. The following is a general list of gear and supplies. This list is by no means exhaustive; however, it is a great reference tool to make sure you have the essential gear necessary on your journeys. Don't worry if you're not quite sure yet what some of these things are or what they're used for; I'll explain all of them as we go along.

POCKETS

- Jackknife
- Compass
- Lighter

BELT

- Sheath knife
- Kuksa (traditional wooden cup) on toggle

BELT POUCH

- Sun glass
- 4" × ½" ferrocerium rods wrapped on the end with 1" duct tape
- Spare lighter
- Carving jack
- 10' #36 tarred mariner's line

HAVERSACK

- Watch coat (oilcloth)

- Kerchief (linen)
- Cordage (partial roll of #36 tarred mariner’s line)
- Work gloves (leather)
- Spare ferrocerium rod (6" × ½" end wrapped with 1" duct tape)

PACK

- 8' × 8' oilcloth tarp
- Large (55-gallon) plastic trash bag
- Twin wool blanket
- Queen wool blanket (or military Modular Sleep System [MSS] bag and bivvy)
- S.A. Wetterlings hunter’s axe
- 1 roll #36 tarred mariner’s line
- Folding saw or 20" bow saw
- Bush pot
- Skillet
- Waxed canvas bag with 3 beeswax candles and 6 sticks of fatwood
- Candle lantern
- Notebook and pencils
- 2–3 full lengths of hemp rope, ½" diameters
- 25' #550 parachute cord (ridgeline)
- Repair kit for knife and axe blades, straps and webbing, or canvas
- 10' #8 tarred mariner’s line
- 2 sail needles, #9 and #13
- 1 Lansky’s diamond rod
- 1 small whetstone
- 2 16P nails

SUMMER FISHING KIT (SMALL)

- 2 rigged lines, 1 fly line floating and 1 braided line with #6 hook
- Small vial of split shot
- Assorted hooks
- 3-prong metal frog/fish gig

WINTER TRAPPING KIT

- 3 #110 body grip traps
- 2 #220 body grip traps
- 1 #3 double long spring trap
- 12 assorted snares
- 25' baling wire
- Firearm and accoutrements (seasonal)

TIPS AND TRICKS FOR YOUR PACK

Used girth straps for horses make great tumplines and can be found cheap at local tack shops. These are made to last and have heavy metal rings that will support very heavy loads if needed.

If you are allergic to wool, alpaca is a great alternative material; however, it will generally not be as water-resistant as wool.

When experimenting with your kit, take a trip to the woods for a night, and when you return, reassess what you did not use. Unless circumstances dictate otherwise, leave it out the next time. If you find you need it, you can add again later.

Remember to always think outside the box about uses for the items you carry. In general, every item should have three uses, but the

more you find, the fewer items you will add later.

Waterproof bags of 5–10 liters are always a good addition to both separate and waterproof essential elements of gear. They can also serve as containers for water collection and storage before and after boiling or collecting rainwater.

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Chapter 2
TOOLS

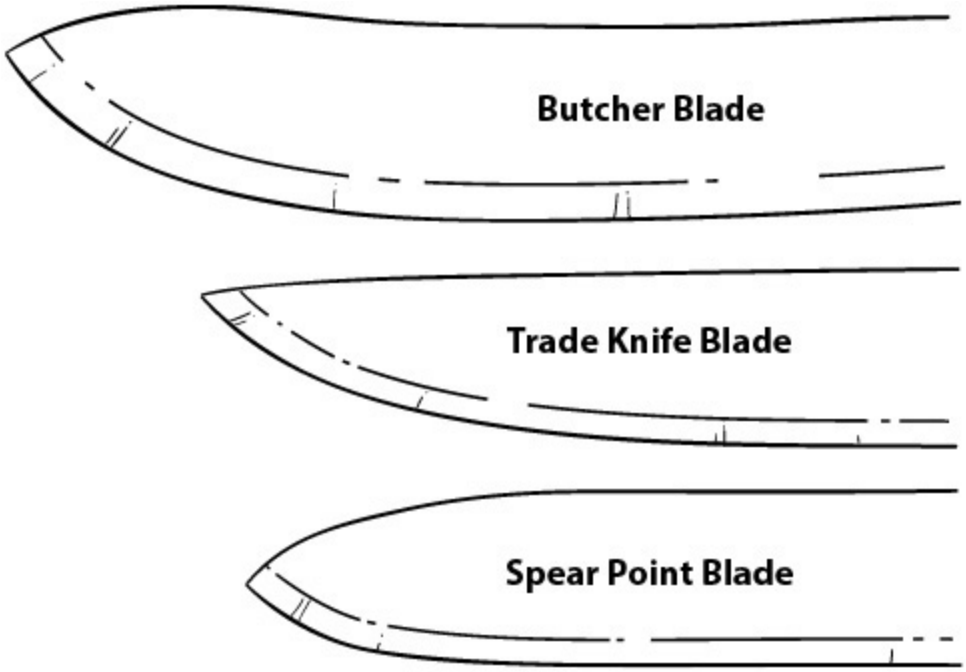
> *"In the early days of American life the Ax and Knife were the two indispensable tools … With the knife they made spoons, brooms, rakes, and bowls; trimmed the skins of the animals they caught, and made the smaller things they needed in the cabin or around it."*
>
> —PHILIP D. FAGANS, 1933

Quality, well-maintained tools can mean the difference between an enjoyable, comfortable tramp and an unsuccessful—or even dangerous—venture into the bush. Remember from Chapter 1 that cutting tools are one of the Five Cs. This means they are essential items when practicing bushcraft. Because there are so many options when it comes to knives, saws, and axes, this chapter will give you the knowledge to select the best tools for your needs and particular destinations.

Caring for your tools is also a crucial skill set to acquire. It is not enough to carry these tools in your kit; proper maintenance will guarantee the longevity and durability of your tools over time. Equally important are your skills in properly handling, using, and safely dealing with your knives, saws, and axes. From sharpening edges to processing firewood to felling trees, this chapter details the essential skills you'll need to become an expert woodsman while protecting yourself—and those around you.

KNIVES

A belt knife is the most important tool any woodsman can own. This being the case, you must keep this tool directly attached to your person to keep it from becoming lost. With this item, you can recreate all other items you need, should an emergency arise. Therefore the ultimate question is, What is the perfect knife? Speaking from experience, I'd say it is usually the one you have on you when the need arises. However, for purposes of this discussion, let's examine the qualities of a knife that will be most useful to you in the wild.



Basic knife blade profiles

Begin by looking at the length of the knife blade. A blade that is too small will make it difficult to process firewood, if needed, especially if you are not carrying an axe or if one is not available. A blade that is too big will make finer carving tasks more difficult. The happy medium is about 4½–6" in blade length. Historically, most knives found along the American frontier

were within this length and had the profile of a large kitchen or butcher's knife. These days blades made from high-carbon steels like 1095 and 01 tool steel are preferable, because of their ability to throw a shower of sparks (much like fire steel). This makes them excellent fire-starting tools. You can use high-carbon steel blades with a hard rock, like quartz or flint, to ignite charred cloth or material, especially if your preferred fire-making method fails or has been used up. The blade spine must have a nice sharp 90° edge; make sure it is not rolled or beveled. Again, this will allow you to use it as a striking device for the metal match or ferrocerium rod.

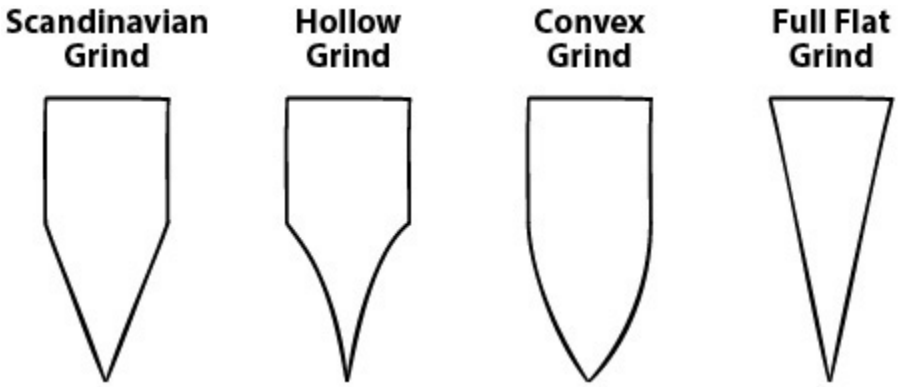
Many knives today are coated with something to keep blades from rusting. You should avoid coated knives; it is very difficult for knives with this coating to throw off a shower of sparks or ignite material in combination with a hard rock. It is better to just maintain your blade to prevent rust.

Any knife you carry as a belt knife should be of full tang design; this means the entire knife is one piece of steel with handles attached to the outside by a pin or screw. This is very important since the knife may take much abuse when processing firewood, especially while being struck on the spine while batoning wood (see following). Because your belt knife is such an integral part of your kit, you should reserve a considerable portion of your kit's budget for this tool.

BUSHCRAFT TIP

The **knife grind**, or the shape of the cross section of the blade, is another consideration that boils down to personal taste. The main grind types are:

- Hollow Grind
- Convex Grind
- Flat Grind
- Scandinavian Grind



Basic knife grinds

Flat and **Scandinavian** grinds are easier to hone to sharpness quickly in the field. They split well but can be brittle, depending on the knife, if twisted side to side, especially in cold weather. They are absolutely the best for fine shaving and carving work. **Hollow**-grind blades will maintain a very sharp edge and excel at skinning tasks but are the most susceptible to damage because the blade is thin. **Convex** edges are the most resilient and best for splitting; however, they are more difficult to maintain in a field environment and not as good for finer tasks.

JACKKNIVES (FOLDERS)

Many types of tools fit into the **jackknife** category, from **Swiss Army Knives**, to multi-tools, to the most expensive of single-blade folding knives. It is important to understand what this tool will accomplish for you, and to choose a knife that is as multifunctional as you need. Before purchasing any pocket-type tool or folding implement, think of it primarily as a knife.

Considering Multi-Tool Functionality

The main problem with most multi-tool knives on the market today is that although they're very useful as far as other tools go, their functionality as a knife is severely lacking. Harriet Simpson Arnow's book *Seedtime on the Cumberland*, published in 1960, tells of a gentleman carving a rifle stock for his broken flintlock with his whittling knife by the campfire. I cannot imagine attempting this task with today's multi-tool knife blades, as they are generally smaller and more flimsy than a traditional jackknife-style blade and much less utilitarian. Some Swiss Army–style folding knives have decent blades, however, and they offer other useful tools as well. The Boy Scouts used a camp-style knife for many years, and even the U.S. military adopted this configuration. This camp-style knife includes a nice blend of tools with a useful smaller blade for finer tasks.

JACKKNIFE SKINNING ABILITIES

Expert Horace Kephart states that if you intend to use this tool for skinning, your jackknife will require a keen blade that is also very durable. Many of our forefathers carried jackknives with multiple blades for such purposes. Today, there are several styles of jackknives made by companies such as Case and Imperial, including the Hunter, the Stockman, and the Trapper styles. For the purpose of skinning, I prefer the Hunter models, which employ two blades: one smaller blade for fish and fowl, and one

larger blade for skinning mammals. These blades are approximately 3½–4" and are a good smaller tool when coupled with a 5–6" sheath knife. Any jackknife you carry should contain the tools that are important to your individual needs and be of the best quality.

KNIFE SAFETY/SAFE GRIPS

Once you've chosen your knife, it's essential that you learn to handle it safely. The last thing you want in the wilderness is to injure yourself (or anyone else) through carelessness.

THE TRIANGLE OF DEATH

The **triangle of death** is the space between your upper legs, including the groin and both femoral arteries. Avoid this area with an exposed blade at all costs. Never cut into this area or hold objects to be cut or carved in a manner that could cause the blade to enter it.

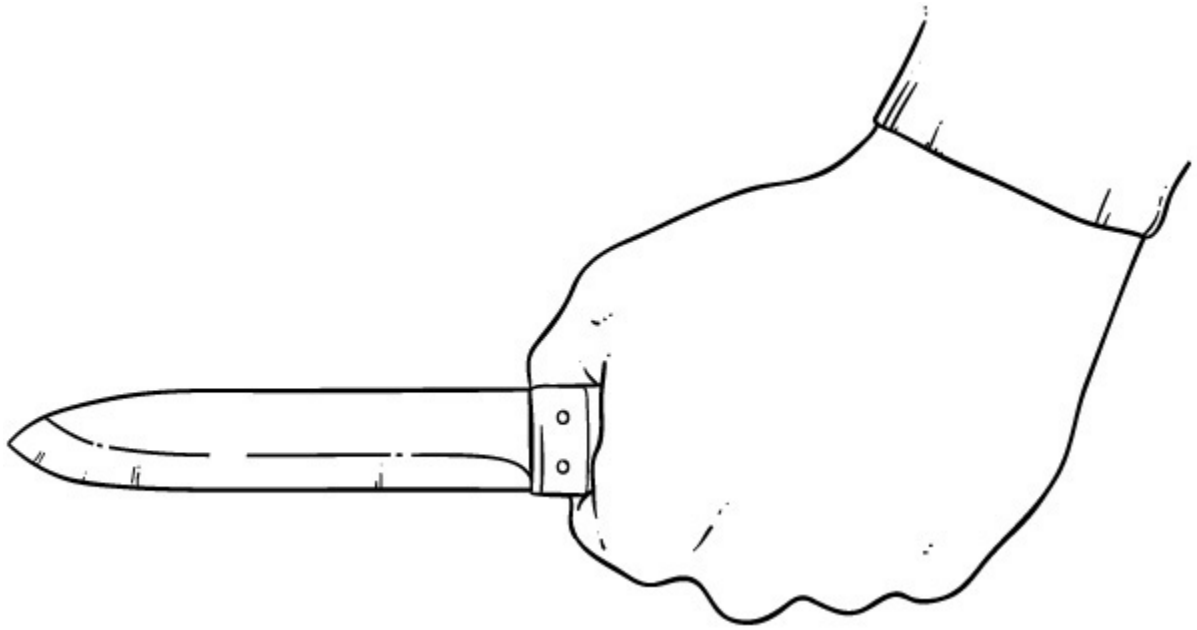
BUSHCRAFT TIP

If you are not alone in your excursion into the wild, any time you prepare to use your belt knife you will need to evaluate your **blood circle**. This is the area 360° around you and farther than arm's length, where someone could come into contact with a blade being pushed away from the material being cut.

IMPORTANT SAFETY TIPS

Safe handling practices with your knife in the field are of utmost importance. For this reason, place your belt knife immediately back into its sheath when you're not using it. Never place it on the ground or on another

piece of gear. Always grip your knife as if making a fist; this will not only give you leverage and control but it will eliminate any chance of fingers contacting the cutting surface. If you must choke up on the blade of your knife for a finer carving task or for using the tip of the knife (as when making a notch or carving a net needle), you should wear leather gloves if available. Practice with your knife will make you more comfortable, but don't replace caution with complacency. A sharp knife is a double-edged sword: capable of the finest of carving tasks, but also capable of inflicting a deep wound and leaving permanent damage.



Safety knife grip

There are two good ways to make your belt knife work for you more efficiently and with more control, as opposed to a free cutting motion where the knife is pushed away from the work:

> **The knee lever**. Lock your wrist holding the knife into your outside or opposite knee while in a kneeling position. Then draw the

material toward the blade, removing material without movement of the knife itself. This method is especially good for taking off large amounts of wood, as well as for finer carving of points and things on tent stakes.

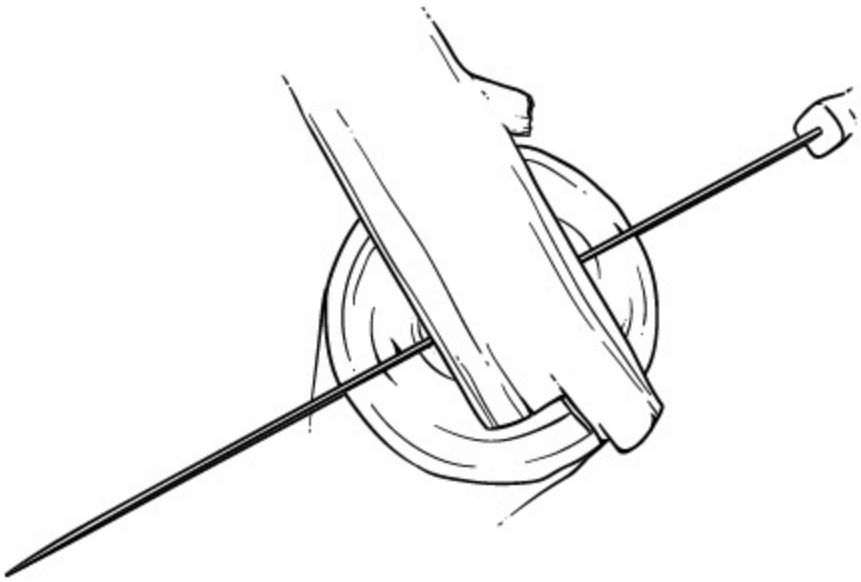
The chest lever grip. Point the knife outward while the arms holding both material and knife are levered like chicken wings from the chest, using the back muscles to control and remove material by moving the object to be cut and the knife blade simultaneously. This is a particularly effective method for removing heavier amounts of material while others are in close proximity.

BATONING

From processing firewood to making notches, you may find the need to baton with your belt knife. **Batoning** is a method of cutting and splitting wood; you use a baton, or stick, to strike the spine of your knife and push or drive it through a piece of wood. This can be particularly effective when creating finer kindling from larger material that may be wet or damp on the outside but dry on the inside. To properly baton with your knife, you will need a baton; usually this is a hardwood branch approximately as long as the distance from your armpit to your palm. Softer woods will damage easily, sending loose pieces of wood flying and causing potential for injury to the eyes. If possible, place the material to be batoned on a flat surface. This will give a steady base and will prevent your knife blade from coming in contact with dirt or rocks by accident. Once the log is stood end-cut up on a solid surface or anvil stump, place the blade of your knife in the position you wish to cut or split the wood. Strike the spine of the knife with your baton, and this will cause the wood to split at the desired mark.

BUSHCRAFT TIP

Woods with a lot of grain, such as oak, may tend to split unevenly from a straight cut; you can counter this somewhat by twisting the blade of your knife away from the runoff while batoning. If you do not split the wood on the first strike, or the knife goes below the plane of the top of the desired piece, you may have to baton again, striking farther toward the tip of the knife on the spine. This is another reason why you must have a high-quality blade. Never attempt to baton a piece that is any larger in diameter than the length of your knife, and try to stay at least 1" in diameter smaller, if possible. If on occasion you run into a knot or something that stops the travel of your blade, insert a wooden wedge above the knife. Strike the wedge with the baton; this will release the blade and often split the wood completely.



Batoning a branch

NOTCHES

The ability to carve certain **notches** in wood is an important skill; you'll use this ability for a multitude of camp needs. There are four notches that you will find most useful.

THE STAKE NOTCH

The **stake notch**, along with the stake's point, will serve you well for making not only tarp stakes but also trap components. To create this notch, select the material and length desired for the project, and decide the location of the notch. Place the material on a solid anvil, and baton a stop cut (that is, a cut that stops against another cut) one-third of the diameter of the wood at the desired top of the notch. Then, using your belt knife and a knee lever grip, step back about 1" from the stop cut, and remove material at a 45° angle toward the stop cut to finish the notch.

THE V NOTCH

The ability to create a **V notch** is a very useful skill when using toggles for any number of things—from tarp lines to pot hangers (a toggle is a small wooden stick hanging from a rope and used as a means to suspend things; see following). This notch helps lock a piece of cordage to the desired area of a toggle. It can also be used on a larger scale to keep material that is stacked from moving if the diameter of the notch is equal to the stacked material or if the piece of wood to be used in conjunction with this one is notched in the same fashion. This notch is similar to a "log cabin" notch (see following), but angled and not as precise in depth or shape. To create this type of notch, select the desired material and place it on a firm surface horizontally. Then, place your blade at a 45° angle and baton the knife blade to a depth of ⅓–½ the diameter of the wood, depending on the use to be made of the notch. Move to the opposite side of

the notch, and repeat the process, creating a “V.” For notches that will be under stress and not stacked, never cut these notches more than one-third the diameter of the material.

THE LOG CABIN NOTCH

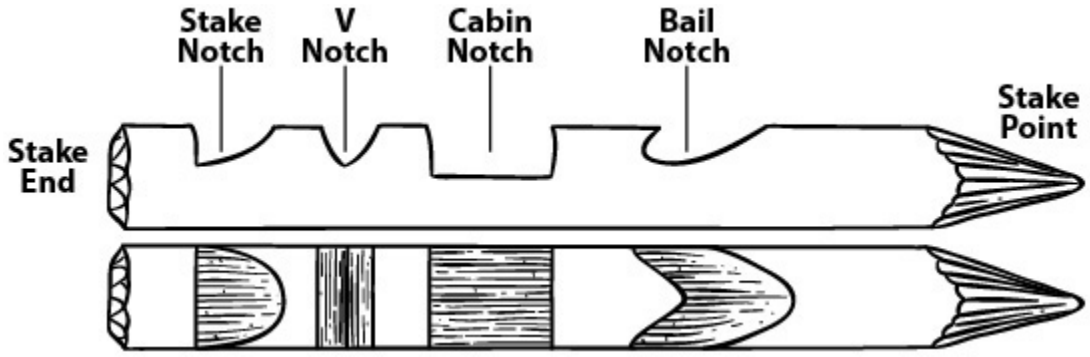
The **log cabin notch** is used mainly for building; it can be used on a small scale to assemble a pack frame or on a large scale to build a cabin. To create this notch, baton the width of the desired notch with stop cuts deep enough to mate the desired piece. Once the stop cuts are made, remove the material in the middle with a knife or small wedge. Remember, when making notches that mate (just as with any building project), you can take away material but you can’t add it if you make your notch too big—so be careful. Measure twice and cut once.

THE POT/BAIL NOTCH

The **pot/bail notch** is useful for making cooking tools. It can be used to support the bail (the wire handle) of a pot and inverted to make an adjustable hanger for moving pots closer to or farther from a flame or coal bed. This notch is a bit more complicated, but you can make it with these simple instructions.

Begin by making two stop cuts one-third of the way through the desired material in an X pattern horizontally. Then, use your knife and a knee lever grip to undercut and remove the bottom or top of the X, depending on the application, to leave a slightly undercut point. If this notch is made correctly, it will hook onto the bail of your pot when made close to the end of the stick or material. If the stick is inverted, changing the direction of the notch, and the notches are spaced apart by several inches, they can serve as a height adjustment by using a cross stick and drilling an indention in a

wedge-flattened area at the end. This will create an area for the point to rest, thereby hanging or suspending your pot.



Basic notches

SHEAR CUTS

The object of a **shear cut** is to shave larger amounts of wood while maintaining control of the material and the knife. Making shear cuts requires an anvil of some kind to make sure the desired materials are steady and will not move side to side or slip. To create an anvil in a fallen tree, make a large log cabin notch in the fallen tree, and use the flat surface for your anvil. This way, you will not place the material being cut on a curved surface.

Shear cutting can be very useful when making feather sticks, very fine curled shavings of wood (see following); it is also great for cutting saplings with your belt knife if an axe or saw is unavailable. You can complete the cuts using one of two methods:

> For small items, such as feather sticks, grip the knife with your fist, place your fist on a solid surface or anvil, and slowly draw the material toward you. By controlling the material's angle, you can create very fine shavings of the material.

If power is needed, as when you want to cut a sapling, use this method: Stand over the desired material, making sure it is anchored to an anvil (or in the case of a sapling, make sure it is securely in the ground). Using your upper body weight, push straight down into the material by moving your arm at the elbow only, with your body weight centered over the top.

CUTTING A SAPLING WITH A KNIFE

Cutting down saplings with a knife should be a last resort, something you should do because you do not have an axe or saw or because you cannot find deadwood to accommodate the needed task. To cut a sapling, you need to place stress on the tree by bending it over and using multiple shear cuts to beaver chew though it.

BUSHCRAFT TIP

A **beaver-chew technique** employs multiple cuts around the circumference of a stick to weaken it toward the center. It's similar to how a beaver cuts down a tree, only you're using your knife instead of your teeth.

As long as you're using a good, sharp knife, the process is pretty easy, but you must take care. Cut the tree as low to the ground as possible to avoid having the stump spring up and hit you. A larger stump can also be a trip hazard in the night. To top a sapling for use in shelter building or thatching (that is, trim the smaller branches toward the top), bend the top of the tree down and around, creating a "C," and stand on the top of the tree.

While controlling the trunk under the arm, use the same shear cut and beaver-chew technique to top the tree.

BARK REMOVAL

Bark removal is necessary for most projects, but is especially important when processing inner bark materials for tinder materials. To remove bark, anchor the material on a good anvil and use the back of your knife in shearing fashion. To make finer shavings of inner barks, fatwood, and funguses, or to create fuzzy materials for tinder, you can use the same technique with adjusted pressure and angle.

BUSHCRAFT TIP

Your knife's edge is a resource, and all resources should be conserved—you never know when emergency could strike and prevent you from getting home when you planned. Another good reason to have that sharp 90° spine on your knife is for ease of bark removal and tinder processing using barks or fatwood.

FEATHER STICKS

Feather sticks can be used as a tinder source for your initial fire lay. They can help establish a fire faster. Create them using softer woods, which are more combustible because they're less dense. Feathered sticks increase the surface area with which heat comes in contact, making it more likely the fuel will ignite. Shear cuts on an anvil or a knee lever are both good techniques for making feather sticks. On larger branches of softer woods, you may need to stand upright when creating the feathers. All feathers should be created on the same plane as the wood. After creating a feather

stick, if you can further reduce the shaving's size, making it about matchstick size, these will work the best.

Make up to twenty of these matchstick-size feather sticks, and use them at the base of the fire lay for a tinder bundle. Feather sticks of fatwood will make a great match for lighting the fire, reducing the time you need to use the open flame of a lighter. The general rule of thumb is that you should never need more than five seconds of flame from a lighter to obtain ignition. Feather sticks will help with this.

KNIFE CARE

It's of great importance that you keep your knife sharp and handle it with respect. It's among the most important tools any bushcrafter has.

PROTECTION

Protecting your knife means caring for it so that it does not rust from extended periods of exposure to damp. The best way to accomplish this is to dry the knife with your cotton bandanna or kerchief before replacing it in its sheath after use. Lubrication on the metal surface will help the blade repel water and also protect it from rust. Choice of lubricant depends a lot on your intent for the blade. I use olive oil to keep my knife lubricated. This is because when I'm processing foods, the knife is never contaminated with petroleum products such as machine oils. If you don't intend your knife to come into contact with food, machine oils will do the lubrication job as well.

SHEATHS

There are many different styles of **sheaths** on the market today. The two most common materials for sheaths are leather and Kydex. Leather is the

traditional choice. Its biggest advantage is that it can hold lubrication within the leather itself over time, so that the knife is lubricated as you place it in the sheath. The biggest disadvantage of leather is that once saturated with water it holds moisture for a long time. To prevent this from happening or at least slow the process, soak your sheath in olive oil at home for about twenty-four hours, then allow it to drip dry before use. Or, you can wax the sheath with beeswax and heat the leather near a fire or other heat source, forcing the wax to impregnate the leather's pores.

The biggest advantage of Kydex—which is a moldable type of acrylonitrile butadiene styrene (ABS), a thermoplastic—is that it drains well if built correctly and is virtually indestructible. The downside to Kydex is that the closeness of the fit creates a tight, hard space that can trap debris. Any debris that gets into the sheath will likely scratch the blade when you move the knife in and out. Kydex holds your blade very well, keeping it secure from loss; when using a leather sheath, purchase one that has a flap over the knife handle that snaps in place and secures the knife at all times.

SHARPENING

You must regularly sharpen your knife to re-establish a worn edge. A dull knife is worse than useless; it's dangerous, since it's harder to control. The sharpness of your knife is a key indicator of your skill level as a bushman.

Whetstones

A **whetstone** is a sharpening stone, a tool used to remove metal from the blade of your knife to create a sharp cutting edge. Whetstones are the age-old method of sharpening or bringing the edge back to a knife. Any sharpening process involves a couple of steps.

First you must understand the actual degree of bevel that the cutting edge of your knife has; it will generally be at an angle of between 10–20°. The

sharpening process is divided into five stages:

Coarse
Medium
Fine
Honing
Strop

A knife maker once told me that you should “sharpen your knife once and hone it forever.” Although that’s true, remember that each step of the sharpening process using coarse, medium, and fine abrasives removes metal from the blade with every stroke.

BUSHCRAFT TIP

Most whetstones were traditionally used with oil as a lubricant, but water is a much better substitute for trail and camp use. Just remember that when you buy a new stone, if you apply oil to it once, you can never go back to using water.

Stones come in different grits, from coarse to medium to fine, and are usually numbered by grit. (The larger the number, the finer the grit.) For example, an 800 grit stone is considered coarse and used for only heavy removal of material, such as large burrs. A 3,000 grit stone, on the other hand, is an ultra-fine grit for final finish work and honing of the knife. In general, I use about 1,000–1,200 grit stones for any routine sharpening, followed by a strop with a good leather belt. To sharpen your knife, you should first let the stone soak in water a bit, allowing all its pores to fill.

Then, lay it on a flat surface or create a stand from wood that will keep the stone level. You can also use small nails to temporarily hold it in place on the flat surface you have created on a log or stump. Once the stone is in place, drag the blade of your knife at an angle determined by the grind (see following) across the stone, from the area closest to the handle toward the tip, maintaining the same angle throughout the stroke.

In sharpening a blade, carefully consider its current condition. If you use too coarse an abrasive, you are wasting a resource by removing more metal from the blade than needed, causing unnecessary wear. If you properly care for your blade, it should never take more than the last three steps—**fine sharpening**, **honing**, and **stropping**—to maintain a keen cutting edge. Using a whetstone will cause a burr (a thin piece of metal pushed to the opposite side during the sharpening process) to form on the opposite side of the blade; removing this will require even amounts of strokes on both sides of the blade as you progress. The rule of thumb here is that you will want two times the number of strokes for each successive step; if you use twenty strokes per side on a fine stone, then it will need forty per side on the honing stone, and eighty on the strop. Once you have obtained a good mirror finish, the blade should be good and sharp if the angle was held correctly.

Remember with stones to always use a water soak before use. Although oils have been a standard for many years in the field, oils will clog the pores of the stone and make cleaning the metal materials difficult. Water will alleviate this issue, and the stones can simply be rinsed in water. A light coat of light oil such as olive oil or animal fat will keep the blade protected after sharpening. The angle at which you hold the blade while sharpening will depend on grind angle of the blade itself.

Diamond Boards and Rods

Many folks today use a **diamond-coated card** or **diamond rod** for sharpening purposes, although most diamond-coated implements are about equal to a medium/fine stone. I have used them quite frequently in the field for quick sharpening. They are easy to pack, make the blade plenty sharp for your field needs, and don't require as much space as carrying multiple stones. You make a sacrifice here in the honing department, though you can still strop the blade with a leather belt. A good compromise is to carry a small, fine whetstone and a rod, then to use the leather belt for field stropping.

Ceramic Rods

Ceramic rods are a honing device and are used to finely dress the blades for burrs before stropping. They are not a necessity, but a small, pencil-size rod will take up little room in your kit. In any case, these rods, whether at home or in the wild, will allow you to obtain a very keen edge both in season and during routine maintenance in the off seasons.

Honing with a ceramic rod is just like honing with a whetstone, but the contact surface is much smaller because of the round rod. Ceramic rods are best used to remove any burr created during the sharpening process, but you can use them as a honing device without sharpening if the knife is cared for properly.

Stropping

Stropping refers to the buffing of the blade and is the final process in making a keen cutting edge. If you don't let your knife go too long without a proper sharpening, stropping alone can often bring the edge back very quickly. In the field, a good leather belt will work as a strop. When stropping, you will actually be pulling the blade in the opposite direction as you would with a stone or rod. A good practice is to find the angle of grind,

then hold the knife itself at a 45° angle to the strop, drawing it toward you with the blade edge away from you.

SAWS

Another essential cutting tool for your kit is the **saw**. As with knives, a wide variety of saws is available, and they have many important uses.

FOLDING SAWS

There are many types of folding saws on the market today, and these are great tools for you to carry into the woods as they are lightweight, compact, and relatively inexpensive. Using a saw is always safer than swinging an axe, and unless you are very skilled with an axe, a saw will be more precise as well. You can avoid a lot of the batoning process when making notches if you have a saw handy, and for trimming and limbing this tool is hard to beat.

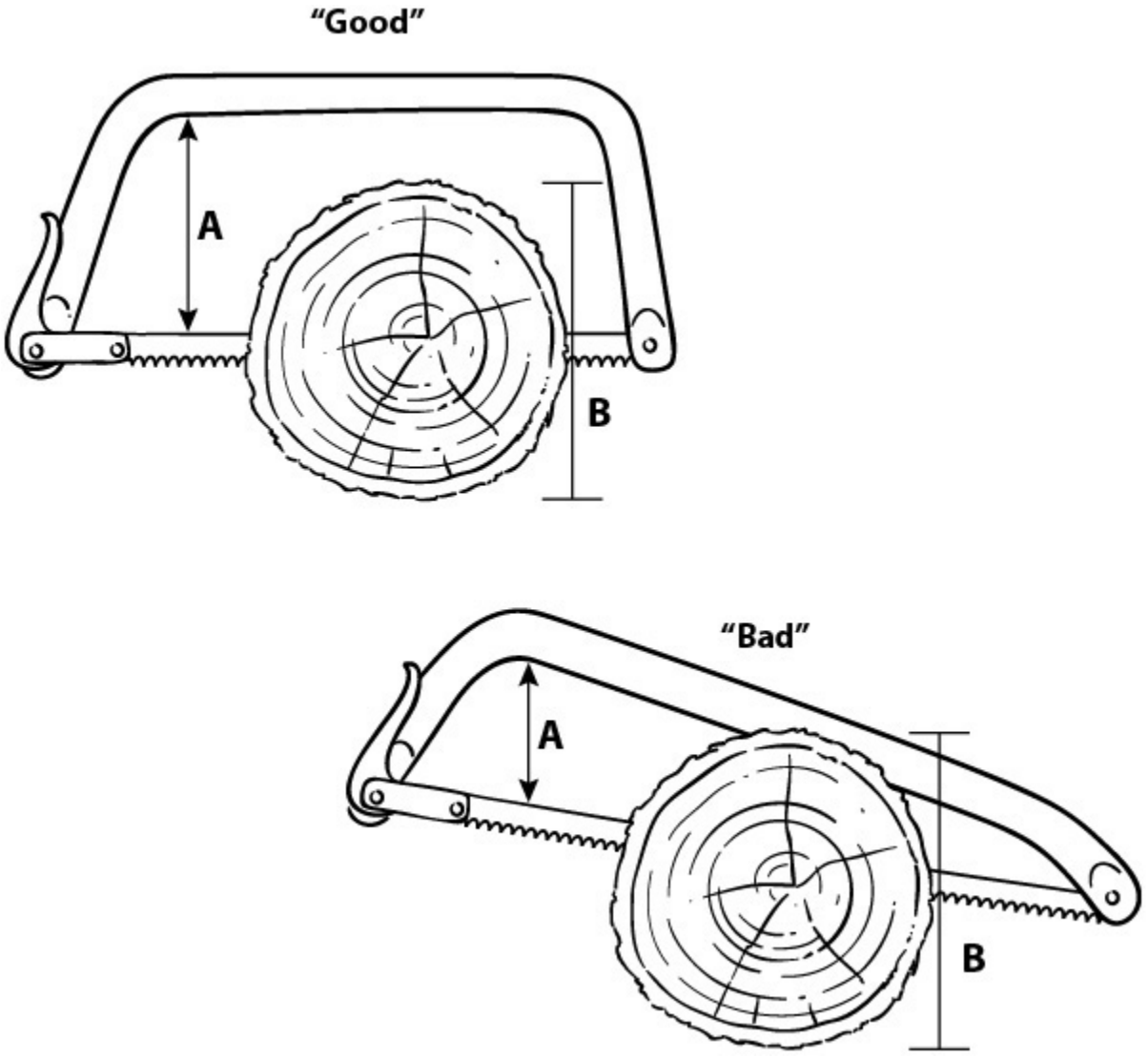
> **BUSHCRAFT TIP**
>
> You can split wood fairly easily using a saw: Take a dry branch, approximately wrist size in diameter, and make a stop cut about halfway through the material. Then smack the piece on an anvil or stump with the stop cut perpendicular to the ground. This should split the branch from the stop cut forward in half.

Many brands of folding saws are on the market, but in my experience the Bahco Laplander is the best saw on the market for bushcraft, and at about

$30 is very affordable. My own saw is more than six years old and is still going strong.

BOW SAWS (FRAME SAWS)

The terms *bow saw*, *buck saw*, and *frame saw* are fairly synonymous; each is a single blade with a frame to hold it rigid. The type I choose to carry is a bow saw. This is a tubular metal frame in a “D” shape with a blade connected to the two ends. They come in sizes from 12–30" and have blades made for many tasks, such as cutting green wood, rough cutting dry wood, or cutting metal. Only carry a bow saw if you are planning a longer excursion (a week or more) into an area where you may need to process larger wood. The power of a good bow saw should not be underestimated; it can make short work of a downed tree and quickly create a large firewood pile. I choose to carry a 20" bow saw, as I like my larger tools to be about the length of my bedroll, or about the length of my armpit to my palm. A frame added to a 20" blade makes the saw about 23–24" overall. A bow saw is a great companion to an axe when felling trees; it’s well adapted to make the felling cut, it’s great for limbing, and it’s the best tool for cutting wood to firewood length once a tree is cut or deadwood is found.



Bow saws

Bow Saw Frame Types

There are many shapes of bow saws, from a basic "D"-style design to an almost triangular shape. Here is the thing to remember about frame saws in general: They are only capable of making a cut as deep as the frame is high. Any angle in the frame will decrease the length of stroke when cutting wood larger in diameter than the height of the saw frame. There are also take-down or folding bow saws on the market, made of both wood and

metal, but I have never been a big believer in moving parts or taking things apart in the woods. A metal tube is about as indestructible as you can get.

SAW SAFETY

Always keep blades of bow saws covered when not in use. The easiest method for this is to remove the blade at one end of the frame, place —" PVC over the blade, then lock it back into the frame. When sawing wood, always place your free hand through the frame to ensure that the saw cannot jump from the cut or cause injury. When using the saw, place your free hand (the one through the frame) on the off fall side. By applying pressure, you will open the gap (or kerf) caused by the blade; this will keep the saw from sticking as it gets deeper in the wood. Saws can make a nasty jagged cut if mishandled, so be deliberate, be safe, and take your time.

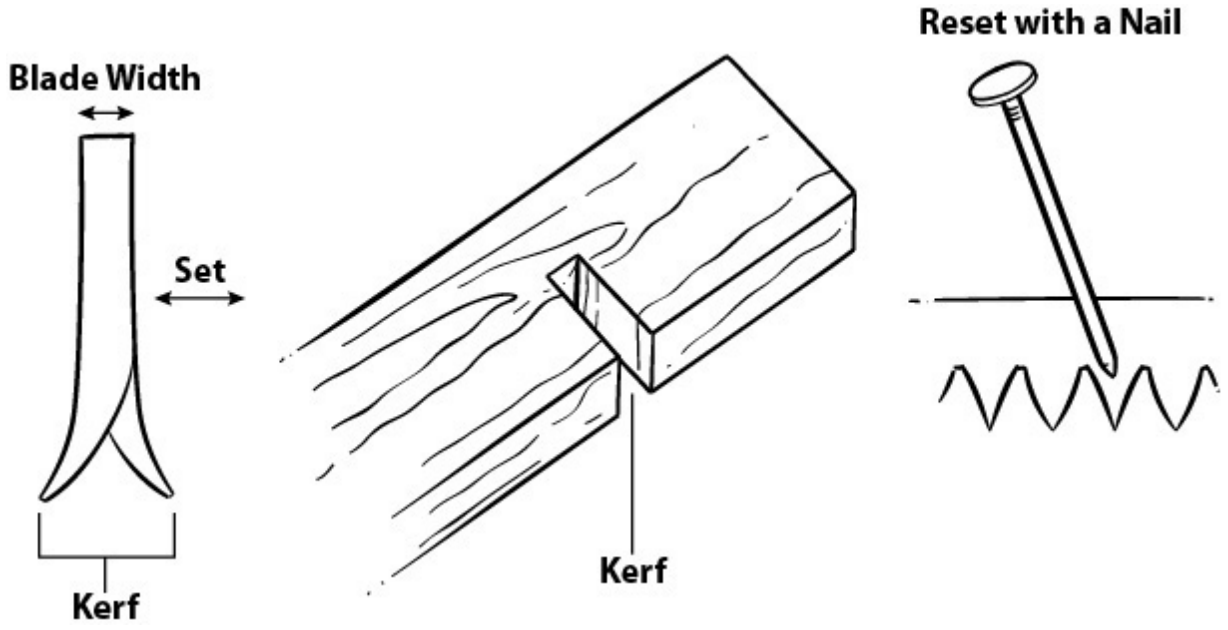
SAW CARE

The blade of your saw may be subject to wear and/or damage from rust. Keep it oiled with the same lubricants you use for your knife and other metal tools. The teeth of your blade are offset, creating the kerf (the space in the cut where wood has been removed); the amount of offset dictates the width of the kerf. As you use the blade, this offset will reduce (and the kerf along with it), causing the blade to bind, or stick, when cutting. Resetting the teeth is more complicated and time-consuming than you probably want to deal with. It is generally cheaper to replace the blade; always carry a spare.

However, if you’re in the field for a long time, you may need a way of resetting the teeth. You can accomplish this chore in two ways:

Use a small set of pliers (possibly a multi-tool or set in your trapping gear) to gently bend every other tooth outward, making sure every alternate one is pushed a bit in the opposite direction. Remove the blade, lay it down on a stump or tree anvil, and gently tap a nail with your axe, moving every other tooth a bit. Then flip the blade and repeat on the other side. This procedure will in no way be exact, but in an emergency it works better than nothing. You can buy commercial tooth-setting tools, but that is another piece of gear to carry and it's not necessary, as the blades will last a long time before needing to be replaced or reset.

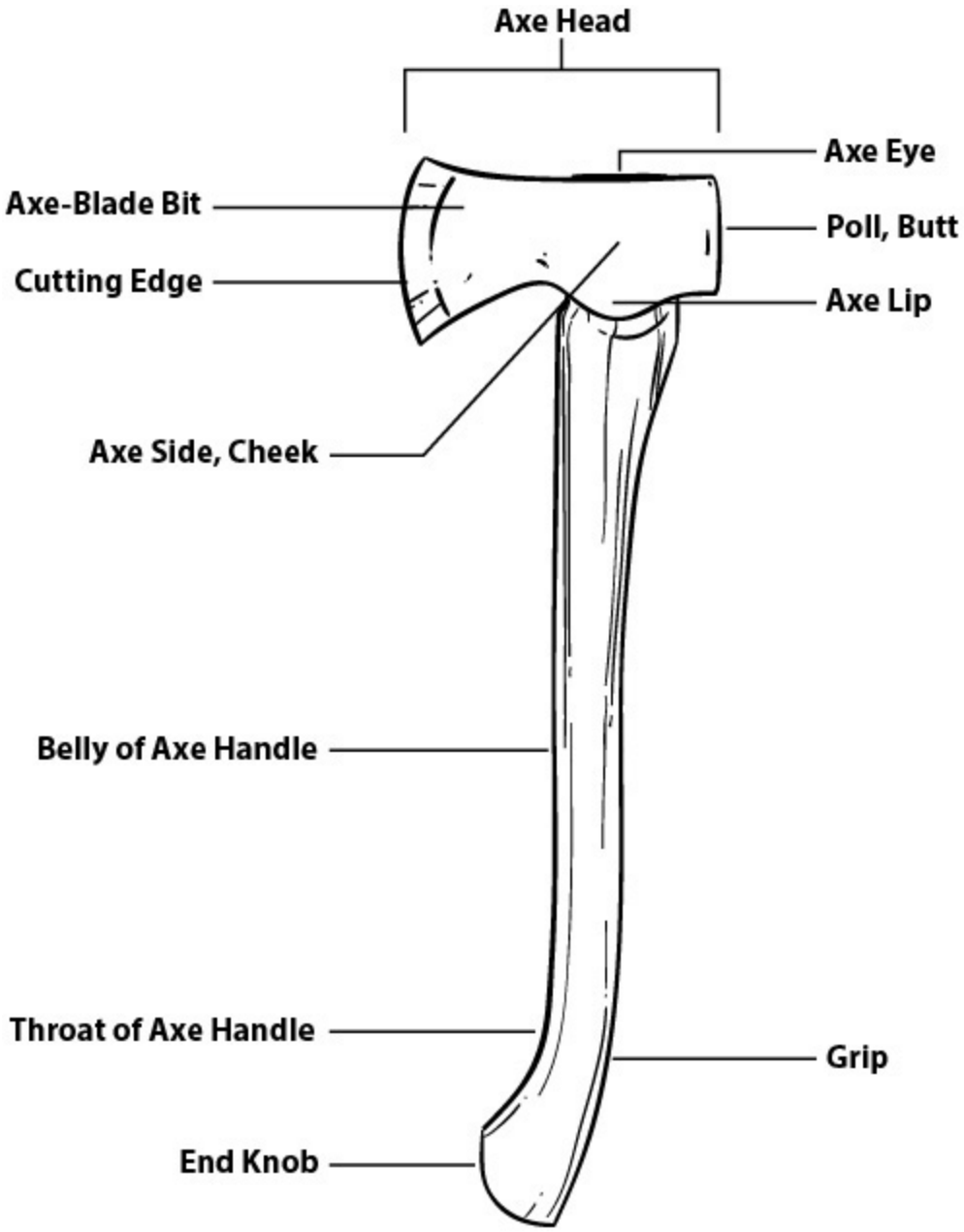
Always remember to replace your blade cover when you're finished using your saw.



Saw kerf and set

AXES

There are many types of axes, handles, and head weights available to the woodsman today, and many are meant for a specific purpose. What you need to consider as the tramping solitary bushcrafter is what needs your axe must fulfill, what types of wood are most commonly found in your area, and how much weight you are willing to carry. The larger the axe, the safer it will be to handle; it will take less inertia to remove material and will require a lighter, more controlled swing. We'll first discuss the different kinds of axes and then learn more about selection and use.



The parts of the axe

TOMAHAWKS

Many of our forefathers carried the belt axe or hatchet as an everyday item; many also carried the **tomahawk** in lieu of a hatchet. A tomahawk differs from a belt axe mainly in that its handle can be easily removed, making it a hand tool that can be used for other tasks as well as chopping.

The handle of a true tomahawk is generally thin and straight, as compared to the axe or hatchet handles, which have a slight curve. Both handles are made of good hardwood such as hickory, but the tomahawk handle is held in place largely by pressure; the handle is tapered and threaded through the head from the top. The tapering keeps the handle from going completely through the head “eye” of the tomahawk, but because it is not fastened into place, it can be easily removed or replaced if desired or if broken.

While the romantic stories about tomahawk fights along the frontier may be true, this was not the initial purpose of the tool. The tomahawk was an early multi-tool and could be used for processing smaller firewood around camp. With the head removed from the handle, it makes an excellent scraping and skinning tool and can also be used as a wedge for splitting logs. For these reasons, the tomahawk is better to carry than a small belt axe, if the purpose of your journey is working a trap line or processing skins.

BELT AXES (HATCHETS)

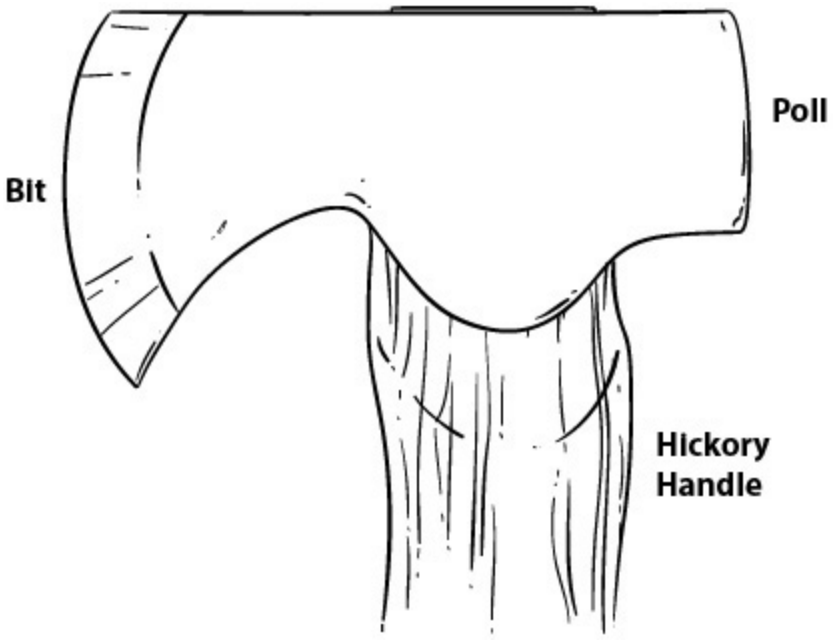
Belt axes, also known as crafting axes or hatchets, have been a staple from the early days along the American frontier; even every Boy Scout had a hatchet within his kit. Belt axes come in many patterns, and hatchets do as well. The main criteria for any of these are similar to a knife: You want the head to be high-carbon steel and hand forged if possible. Always choose a wooden handle so that emergency replacement is possible while afield. Beyond these recommendations, size, weight, and shape are matters of personal preference. Any axe or hatchet with a handle length of less than 16" and a head of less than 2 pounds can be hung on the belt or attached to the body without becoming overly cumbersome.

CHOOSING A LARGER AXE

Axes are also available in many patterns, as well as weights and handle lengths. The decision to carry an axe large enough that you must attach it to a pack or frame must be justified by the type of work to be done around the camp and on the trail. An axe with a handle length that spans from your armpit to your palm is a good felling axe. You'll only need this size if it's necessary to fell larger-diameter trees. (Large trees, for purposes of this book, include timbers large enough to be considered structural, or 8" in diameter and larger.) For smaller tasks than these, an axe somewhere in between the size of a felling axe or belt axe will work nicely and will be very useful for other camp tasks. The hunter's variety of axe, with handles from 15–18", is about the best compromise for an all-around axe. As for the brands or types of axes that suit the woodsman best, the Swedish axe makers are the best. I have never had an S.A. Wetterlings brand or Gränsfors Bruk fail me in the field.

GRINDS

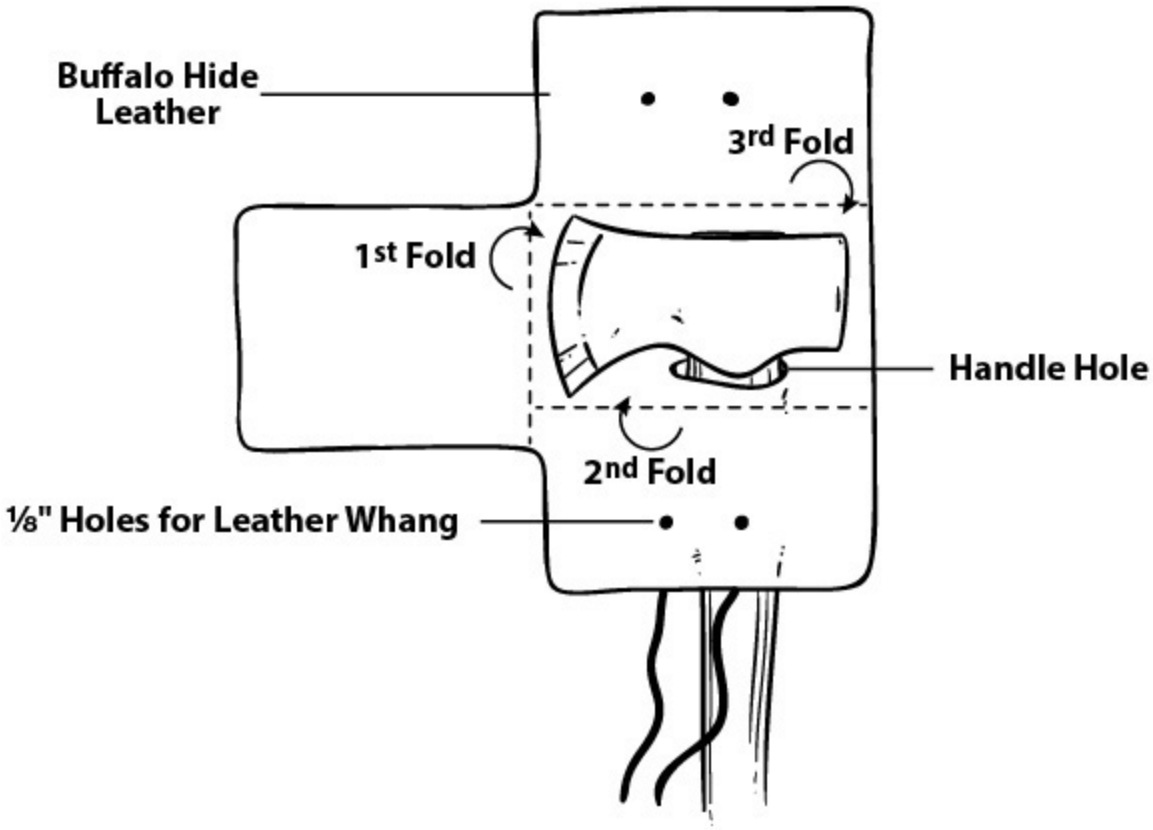
When selecting any axe, the blade grind depends on its intended use. A more convex grind will be a great splitter for dry wood, but it may not penetrate damp or frozen wood as well and will demand more of your energy. A convex grind is not good for finer tasks, such as pointing stakes and uprights or cutting notches into logs. A more Scandinavian "Scandi" type of grind is a good all-around grind both for splitting firewood and for construction. Most of these Swedish-type axes have a slight secondary bevel on the face of the bit to create the actual cutting edge.



Scandinavian axe head

SAFE HANDLING AND USE

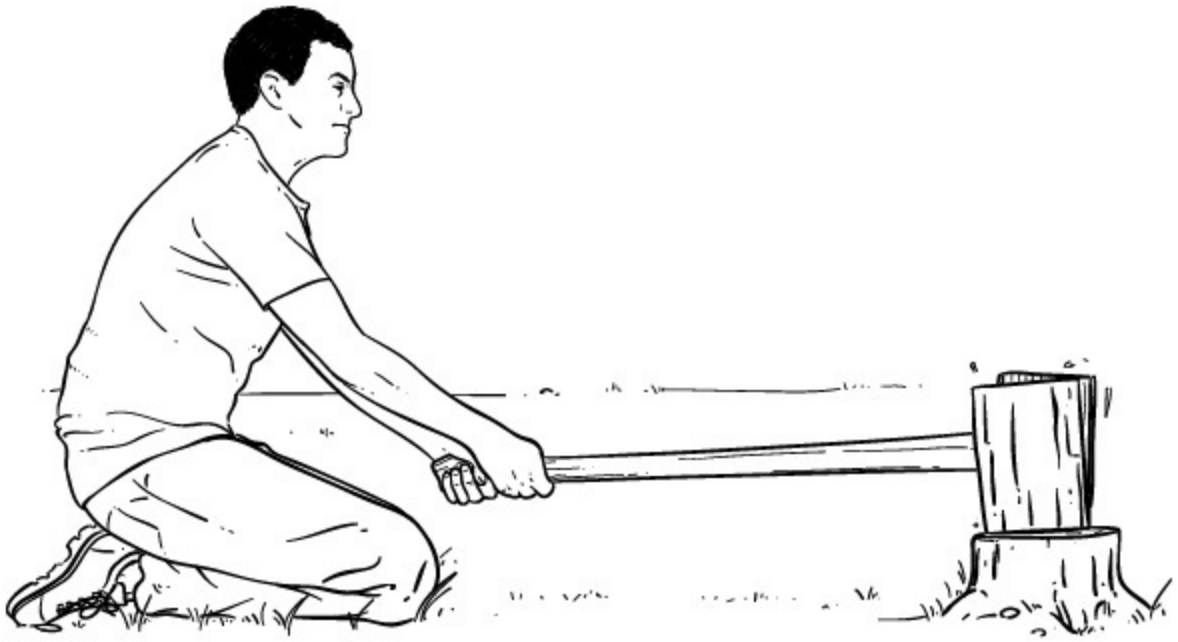
One of the marks of skilled woodsman is how he handles and cares for his tools. It is important to *always* keep a proper mask on any axe or hatchet not in use. Always have a durable and safe mask available, or be ready to make one at a moment's notice. Never lay your axe on the ground; it could become a tripping hazard. Instead, lean it head-down against a tree or return it to your pack system. When preparing to wield an axe, just as with a knife, you should ensure a clear area—not only clear of others but also of anything that might entangle your axe during the swing or deflect it from an even arc. Always ensure that wherever your axe will strike, a glancing blow or miscalculated strike will not injure you or damage your axe by hitting rock or soil. It is good practice when splitting wood to use an anvil, whether it be larger wood stumps or bucked stubs. You can also create an anvil by notching a downed log with a large log cabin notch to give yourself a flat surface.



Axe mask

SPLITTING FIREWOOD

If possible, you should split firewood while kneeling so as to eliminate travel of the axe if you miss the log. This will clear your legs of possible contact and keep you in a much safer position than standing. To accomplish this, kneel in front of the anvil and adjust your position so that when the axe head is in the middle of the anvil, your arms are outstretched. In this position, the axe may strike the ground (although this isn't desired), but it can never swing into your legs or feet. Never use a knife for a job that can be accomplished by an axe, but be mindful that the smaller your firewood becomes, the more dangerous it becomes to process with a heavy implement.



Safe wood-splitting position

Another way to split a plank of wood is to lay it horizontally on the anvil instead of vertically. This will create a smaller margin for a miss and allow easy splitting to kindling size. Remember when splitting any wood that it will tend to fly left or right of the anvil; these areas should be cleared of persons or gear before starting. Once you have processed the wood to smaller than wrist-size pieces, you can use a compound anvil for final splitting of longer pieces. Place the desired piece onto the anvil horizontally; once you've made the strike and the axe has penetrated through the wood into the anvil, leave the axe stationary and pull the wood to one side to complete the split.

PROCESSING FIREWOOD

You should be able to process an 8" diameter log that is approximately 12" long into 88 pieces of kindling if necessary, or into any derivative that is needed from that. Use pieces at least 2" in diameter for fuel sources, and

pieces no bigger than large #2 pencils as kindling. Remember that harder and green woods will burn longer, but softer deadwood will take flame faster, so a combination may be necessary for a good fire lay, depending on your conditions.

FELLING

Felling a tree can have an effect on the environment, so it should not be done lightly. Always use deadwood for any construction and smaller saplings when you can. If it's necessary to fell a tree, consider the following before you proceed:

> Select the smallest available tree that will meet the needs you have.
> Ensure that the safe zone is clear of any gear or obstructions. (This includes other trees that may affect the fall of the intended tree. A tree hung halfway down in another tree top presents a whole other set of issues.)
> Ensure that you have a good escape route from the area behind where the tree will hinge.

JUDGING THE HEIGHT OF A TREE

To understand the safe area you must create before felling a tree, you need to know how tall the tree is so you know how much area is needed. To accomplish this, you can use your compass inclinometer. Move away from the tree until aiming the compass at the top shows a 45° angle on the inclinometer. At this point, the distance you are away from the tree will be approximately equal to its height.

BUSHCRAFT TIP

If you don’t have a compass, use any measuring device. I generally burn marks into the back of my axe handle at 1" increments. Take a measurement from the base of the tree, and tie a cord at a convenient height, such as 5'. Step away from the tree until you can capture that 5' of height within the 1" mark on your axe. At this point, look up at the top of the tree and figure how many marks on the axe the tree is tall, and then multiply that by 5' to get an approximate height of the tree.

SAFE ZONE

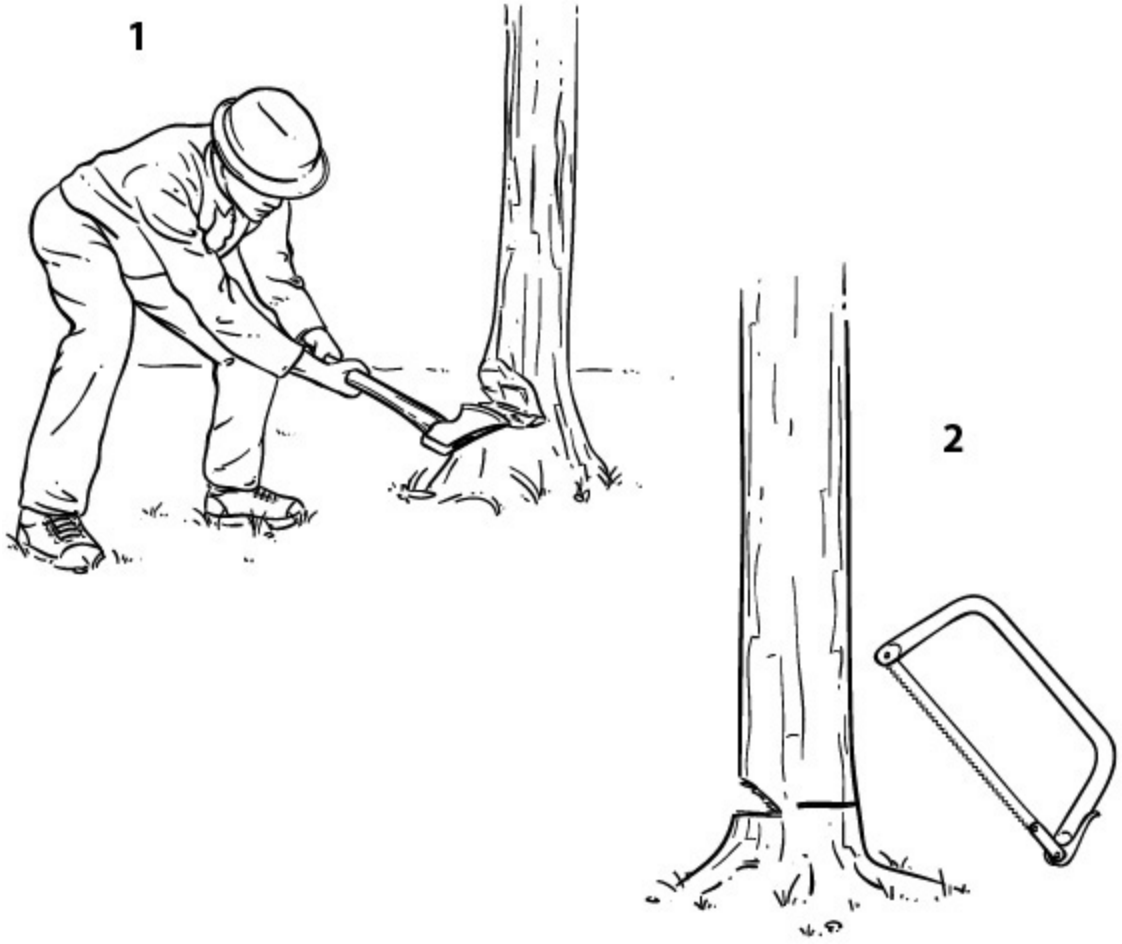
Felling large trees should be attempted only by the experienced bushcrafter, as it can be dangerous. To choose trees of load-bearing grade that are still fairly safe, use the “reach around test.” Hug the tree you have selected, and if you can touch your left shoulder with your right hand, or vice versa, it is of a safe size to tackle alone or without a lot of experience. Always try to fell on level ground without large rocks or other levering points in the path of the falling tree. Check the safe zone—an area 180° in the direction of the intended felling—to be sure all personnel and equipment are clear.

FELLING CUTS

To fell a tree, assume a position for chopping to one side of the tree—never behind it—and a full axe length away. Check to ensure that you have an escape route and have cleared the area of entanglements, etc.

Felling a tree requires that you make two cuts to create a hinge for the tree to fall and not shear. (If the tree shears it can kick backward, possibly causing injury.) The first cut is made on the front of the tree in the direction

of the intended felling, and is called the undercut or front notch. This will be a notch that is flat or perpendicular at the bottom and is at a 45° angle at the top. This cut should be about as high as half the diameter of the tree, and cut a bit more than one-third of the way through the tree. The second cut, which is made to the backside of the tree opposite the felling direction, is called the felling cut. It is made with either a saw or axe, and is set up to have the apex of any angled cut approximately 2" above the front cut apex. This will create a hinge that makes the tree fall forward. This cut should only be about one-third the diameter of the tree, as to leave a hinge. Wedges are used to ease momentum of the tree toward the felling cut.



Wood harvesting with hand tools

LIMBING

After a tree has been cut down, or if you wish to process a **deadfall** tree, you will need to limb it (that is, trim off the limbs), either for further processing or to collect firewood. When limbing a tree, always stand on the opposite side of the trunk from the limb you intend to cut. That way, the axe can never strike you. To limb a tree that is lying on the ground, always cut from the back of the limb's connection to the tree, not into the crotch or apex of the connection. Splitting into the crotch will often cause the tree to split and not clean-cut the branch.

BUCKING AND NOTCHING

Cutting logs for splitting ("bucking") or notching them with an axe so they can be used in construction is usually done, as with a saw, by jacking by tripod. (Jacking by tripod means using a tripod to support the area to be cut so that you have a free hanging end of the log or branch, and so that the blade doesn't stick in the cut.) When bucking logs with an axe, use a V notch and roll the log to make four cuts, completing the separation. When cutting a notch in the log, you should actually stand on top of the log to make your cuts, if possible. If the log diameter is too small to stand on comfortably, stand opposite to the side you are cutting. Never make the cut on top of the log, but always on the sides to avoid errant glances that could cause injury.

BATONING THE AXE

For purposes of making slats, planks, or shingles, fashion a large baton so you can use the blade of the axe in place of a **froe** (a froe is a flat metal cutting blade attached to a handle; it's used with a baton to make thin splits

of flat plank wood when making shingles). As with the tomahawk head, this will allow you to use the axe head in a more controlled fashion as a wedge for splitting off these items from a heavily grained hardwood or cedar.

AXE CARE AND SHARPENING

As with any tool, your axe needs tender loving care to remain at peak efficiency. This includes storage, maintenance, and blade sharpening. Here are some basics of axe care.

HANDLE CARE

When you purchase an axe, pay particular attention to the handle's grain. Handles should be made of hickory and have a straight grain running the length of the handle with no run-outs to the outer edges. (Run-outs can cause the handle to split during use.) There should be no knots within the handle. Sapwood handles are better than hardwood, but a mix of both is okay. Treat your handle with linseed oil to seal it after use, as the finish will wear and it will be susceptible to drying out and possibly cracking. How often you do this depends on humidity, temperature, and use.

AXE HEAD

Caring for the head of your axe is no different than caring for any other high-carbon tool. It will rust, so it must be kept lubricated. Again, I generally use olive oil for this purpose (although I would rarely use my axe for any food processing); it keeps things consistent in caring for all my tools and metal gear.

SHARPENING

Just as with a knife, there are several tools to use when sharpening or honing an axe. A Carborundum stone with medium and fine grit sides will

take care of 95 percent of your needs, and you can carry a small one in the field. Lansky makes a tool called the puck that is a fine and medium two-sided sharpening tool, about the size of a hockey puck. It works very well. As with whetstones, I prefer to use water and not oil as a lubricant for the puck. When using this type of stone, make circular strokes to sharpen the blade, attending to both sides evenly, as with a knife. If your axe gets a bad nick from a missed swing or glance, you may need a fine mill file to remove the nick. Then sharpen it with the stone.

When using a file, place the axe in a stable position and push the file with the angle of the grind against and into the blade, or away from it, depending on your preference. To remove these nicks or dings, slow even strokes will be both safe and accurate. Stropping an axe is unnecessary, as a fine stone will make your cutting edge plenty keen. As with knives, grind on axes varies, and following the existing angle is best.

ALWAYS CARRY WEDGES

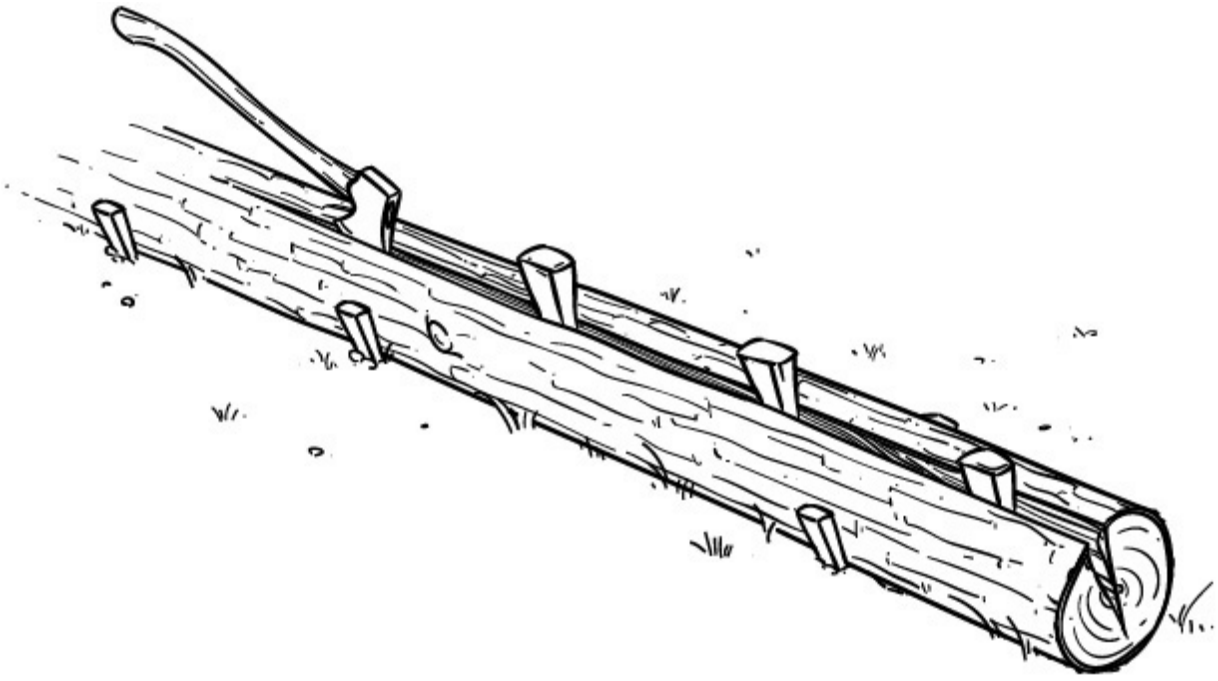
Wedges are of great use in the woods for many tasks, but we will discuss just a few here. You can make them from wood, but it is highly recommended that you carry at least two prefabricated ones. Wedges made from ABS plastic materials are cheap and lightweight; they can be easily carried and can be a lifesaver.

WEDGES FOR FELLING

Once you make a felling cut and the tree starts to fall in the intended direction, place a good wedge into the felling cut and tap it in with the blunt end (the “hammer pole”) of the axe. Of course this should be done with care and never from directly behind the tree.

WEDGES FOR LOG SPLITTING

When splitting a complete log, after you make the initial splitting cut use several wedges to help split the log along its axis. Baton the wedges into the crack successively as the log begins to split.



Wedges for log splitting

WEDGES TO FREE YOUR KNIFE

At times while batoning or splitting wood with a knife, you will get your blade stuck in the piece being split. If this happens, place a wedge into the initial split, and drive it in by baton to open the slit and free your blade.

TIPS AND TRICKS FOR YOUR TOOLS

Make an easy, packable sharpening board by attaching 1200 grit wet/dry sandpaper to a paint stick, using double-sided carpet tape.

If you break the handle of your axe and need to remove it for replacement, the best way to do this is by burning it out. Bury the actual cutting edge up to the cheek in dirt; then build a small fire around the eye to remove the old handle material without removing the temper from the cutting blade.

If your knife does not have a 90° spine capable of removing material from your ferrocerium rod, you can use a mill file and vise to carefully remove material and square the spine.

To quickly add a protective patina to your high-carbon blade that will help protect it from rust, use the juice from green-black walnut hulls; apply it liberally to the blade and leave it to set for two hours. This will give you a nice black patina. Then oil and store.

To make a safety cover for the cutting blade of your bow saw, cut a poplar sapling in the spring and split the bark lengthwise. Remove the bark from the wood, place around your blade, and let dry.

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Chapter 3
ROPE, CORDAGE, WEBBINGS, AND KNOTS

"It is extraordinary how little the average individual knows about the art of making even the simplest knots."

—R.M. ABRAHAM, *WINTER NIGHTS ENTERTAINMENTS*, 1932

You must carry cordage as one of the main elements of your kit because of its usefulness in creating other items. You must also carry it because it's difficult to create in large quantity with natural material, and doing so would take a lot of time. Cordage is useful for making fire, lashings, and bindings and is helpful in trapping, fishing, and a host of other things. Therefore, it is important for you to take a close look at the cordage you choose to carry within your kit. Just like all the other elements of the Five Cs, it must be capable of a multitude of tasks. While cord and rope are actually synonymous terms, for sake of this book we will identify cordage as having a diameter less than ¼", and rope as anything above ¼" that is made from multiple fibers, whether they are natural or synthetic.

CORDS

Some cords, such as Military 550 cord (**parachute cord**), have an outer sheath called a mantle. This is a woven sheath, generally of poly material,

that covers inner strands or cords. In the case of true 550 cords, there are seven strands inside the mantle. The 550 cords are popular within the camping realm because most survival-type manuals mention this cord; they do so because many of the older survival manuals were largely based on military doctrines, and the military had plenty of 550 cord. In earlier times, ropes and cords were made of natural materials such as **hemp**, cotton, jute, or sisal.

There are many types of cord available for you to use in the bush, but I find mariner's tarred twisted nylon twine to be superior cordage to anything else available today. It is made of three fibers of synthetic material that are woven together. It comes in strengths of line tests from about 80# test to over 500# test (these numbers refer to the twine's tensile strength) in a thin diameter and useful package. The biggest fault of the traditional para cord (550) is that it's really only useful in its original state. Once the mantle is removed, the seven inner strands tend to split apart and fray easily. This makes it difficult to extend the amount of cordage you have by breaking it down, or reducing the diameter to meet the need at hand. Para cord works well for making improvised fishing lures and lillian for cane poles (the lillian is an attachment braid on the end of a tenkara rod; see Chapter 10). Tarred mariner's line, however, breaks down easily to three smaller fibers, has a tar coating that protects it from UV rays, and binds well to itself when using it for lashings or bindings. I generally carry a 1# roll of two different sizes: #12 and #36. The #12 is great for net-making and fishing, while the #36 works for any heavy lashings and bindings or to include tarp guy lines.

ROPE

Unlike cord, I prefer my rope to be of a natural material such as hemp. The main reason for this is its flammability, which aids in fire-making and when

creating a bird’s nest (discussed later). Rope can be used for a number of things, such as improvised pack and bedroll straps. It can be worn as a belt for your outermost garments to keep your sheath knife and belt pouch readily available without your having to fumble under your coat or blanket shirt. You can also use rope for many camp chores, such as suspending game animals for processing, pulling tent stakes, hanging a hammock, or improvising a windlass to move a heavy object. I recommend carrying about two ropes 12' in length and one rope 25' in length at all times when tramping alone.

WEBBING

Tubular webbing is used for climbing, so it has a very high tensile strength to prevent breakage. It has some advantages over rope in that it weighs less, takes up less room, and has a higher tensile strength. When making improvised straps and such from this material, you’ll find it much more comfortable over distance than rope. Because webbing is flat, you’ll be able to carry more of it. Because webbing takes up less room than rope (generally), I recommend two 20' sections and a 50' section if room and weight allow. This material will do anything rope will do—and a bit better in most cases, other than help with fire-starting. You can always carry a bit of both, as I do.

MULE TAPE

Mule tape is a mantle with no inner strands and is used by electricians. It has a very high tensile strength relative to its size, and you can carry 100' without adding more than a pound or so to your pack. Mors Kochanski, Boreal bushcraft instructor and a well-known Canadian writer, is a big

believer in this product, and I respect his opinion. However, like all other components of your kit, environment is a very important consideration. In the eastern woodlands, there are so many briars, cat claws, and thorns in general that mantle-type cord or rope is not feasible because of the fraying of the fibers and weaves over time. However, if your environment allows it, it is great for all things of which a heavier rope would be capable.

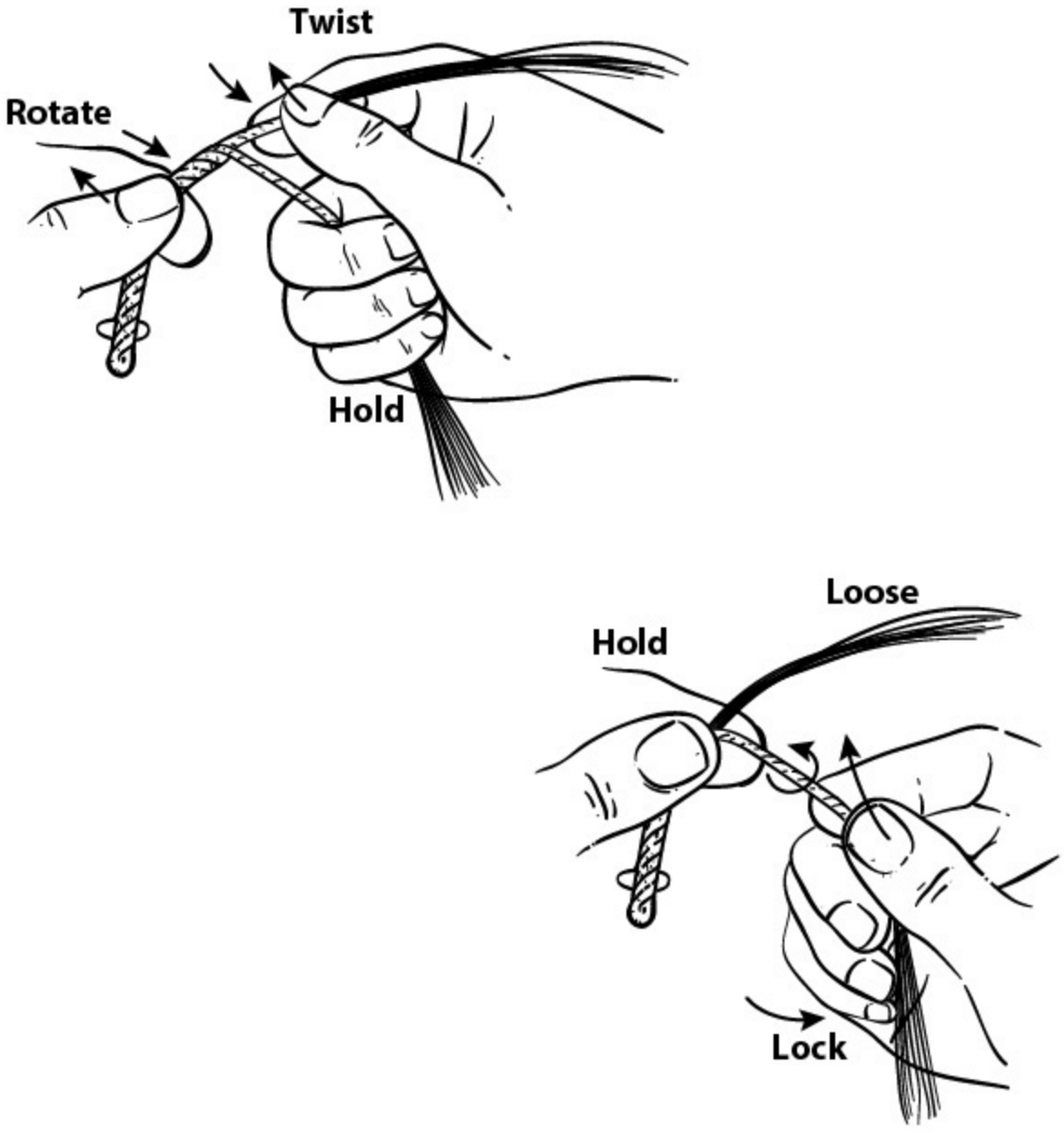
MAKING NATURAL CORDAGE

To make natural cord, first you must know the correct material to use for this purpose. It must be fairly strong, depending on its application, and it must be available during all four seasons. There are many plants and trees that will make natural cord in the eastern woodlands. To make a single cord from natural material of passable strength, you only need to look as far as vines or the roots of spruce trees on the ground. Some of these can be relatively strong, and it is best to test materials in your area before the need arises by harvesting a section and attempting to tie an overhand knot in the cord. If doing this breaks the cord, it may not be viable for some tasks, but if you can make three or four wraps around your finger and it does not split or break, it may be passable for some applications.

REVERSE-WRAP TWO-PLY CORDAGE

To make this type of cord in the eastern woodland, the best material will be the inner barks of the shagbark hickory or the tulip tree (yellow poplar). Other options for plant fibers outside the eastern woodland are yucca and nettle, as well as dogbane. Yellow poplar is by far the easiest and will make a good strong cord for most applications in any diameter needed. Recently fallen or dead fallen poplar is the least desirable cordage material but will be the easiest to harvest. Pry the edge of this bark with a knife and peel it

off; it should come off in long strips depending on the branch or tree. Then remove the outer bark to get to the inner bark fibers. To do this, work the piece around a rough-barked sapling or a rope; this will loosen and remove the outer bark. Once the fibers are obtained, you need to process them further into smaller strands, then into groups of strands to obtain the desired diameter of cord.



How to make cordage

When you are ready to begin, separate the strands into two separate bundles. Holding both bundles at the same time but keeping them separate, twist them one at a time in the same direction. After this, pinch both bundles together and twist both bundles in the opposite direction (that is, they are reverse wrapped and twisted first one way then against themselves the other), and then repeat the entire process until finished. It is best to start with bundles of two different lengths so that you can splice another bundle into the cord to add length. Do this only on one side at a time, never at the same time. When you reach approximately 1" from the end of the shortest bundle, add another bundle on that side, twisting it with the tail and making it one bundle. Then, continue to reverse wrap as normal until the splice is within the cord. If a stronger cord is desired, you can always use two cords fully processed, and cord them together with the same process. This will give you roughly two-thirds the original strength of a single strand the same diameter. This same technique can be used with cords such as mariner's tarred twisted nylon twine to create a stronger cord as well.

BASIC AND USEFUL CAMP KNOTS

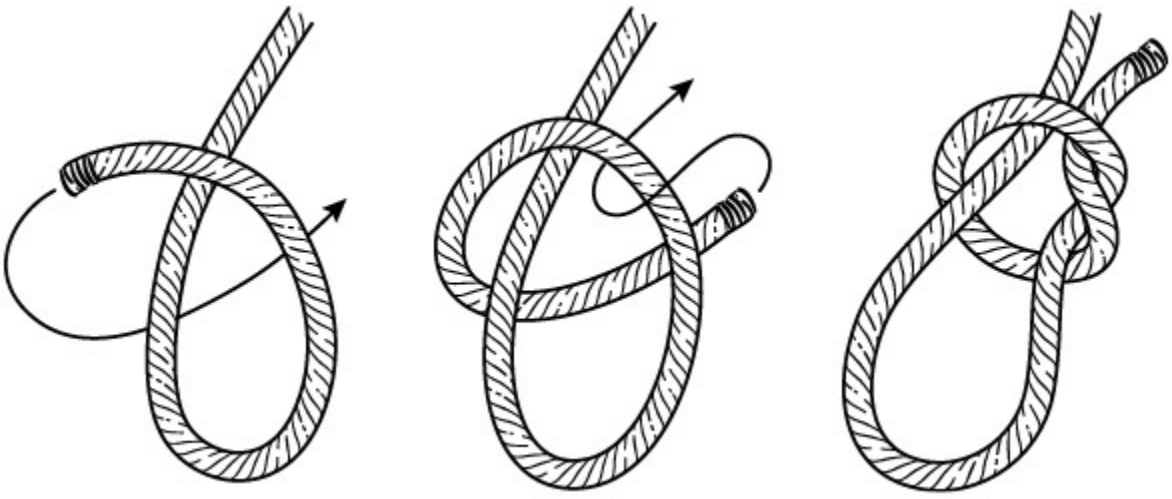
Knots are the basis of all lashings and bindings, as well as essential for securing anything from a load to a toggle. We use knots in life every day, and there are hundreds to choose from. Practice knots often until you've mastered them; you should be able to tie them behind your back and blindfolded so that you can do them without thinking if needed! Whether you're tying down gear to a frame or building a shelter, the use of knots, lashings, and bindings is a critical skill. Many knots will allow you to recover cords that may otherwise need to be cut, and this will conserve an important resource. Proper lashings can mean the difference in a shelter that

stands a storm or one that collapses under the weight of snow, and a pack frame that lasts for years or breaks three miles into a weekend tramp.

Of the hundreds of knots available, this section only covers a few that I consider essential for bushcraft, as well as the importance of cord recovery to conserve a resource. We will discuss three basic types of knots: slipknots, binding knots, and static knots. Slipknots, as the word implies, tighten with the slippage of one line though a loop or loops in another. Binding knots tighten by friction of rope on rope. Static knots are standalone knots and do not require further action to function as a knot.

STOP KNOT

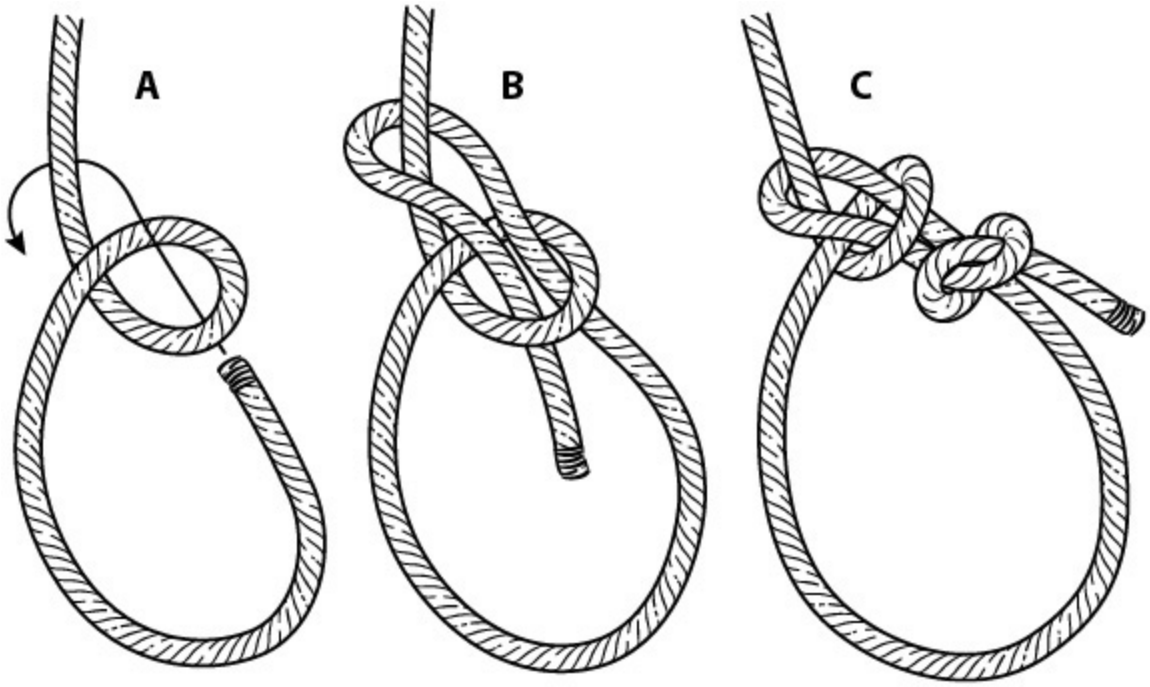
A stop knot is a simple overhand knot used at the end of a line that will keep the rope from slipping. The knot works well with any other knot as a security measure. Generally, you want this simple overhand knot to have some tail beyond the knot itself. With any line or knot, you should tie a simple overhand stop knot on the tag end to ensure that if a knot does slip, it will not come undone. The stop knot will keep the line from slipping completely through.



Slipknot

BOWLINE KNOT

The bowline knot (pronounced BO-lin) is one of the four basic mariner's knots. This knot is a standalone knot, and is also a main knot used in rescue operations. This knot will retain two-thirds of the line's tensile strength even under load and is ideal for putting a static loop at the end of any line. The single downside of this knot is its tendency to slide or come undone under a heavy load, depending on the cord used to make it. However, this can be easily circumvented with a stop knot on the tail.

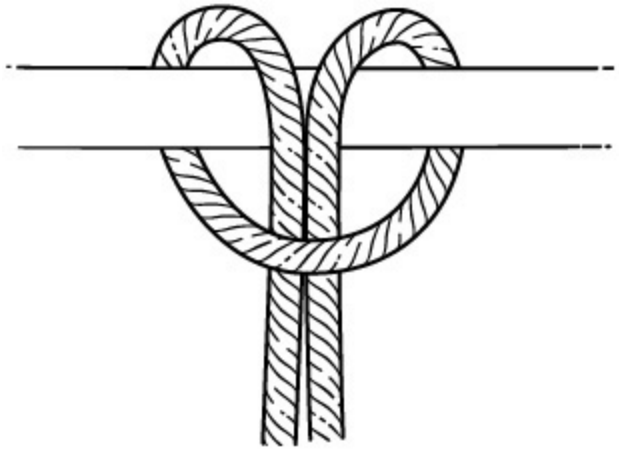


Bowline knot

The bowline knot is best for any end-of-the-line application where you need a loop to pass the line through and tighten around an object, such as the ridgeline of a shelter. This knot will be easy enough to remove even if great stress is placed on the line. It is useful for incorporation with other knots, such as the lark's head, for tarp tie-out lines, and for toggles at the end of a line as well.

LARK’S HEAD KNOT

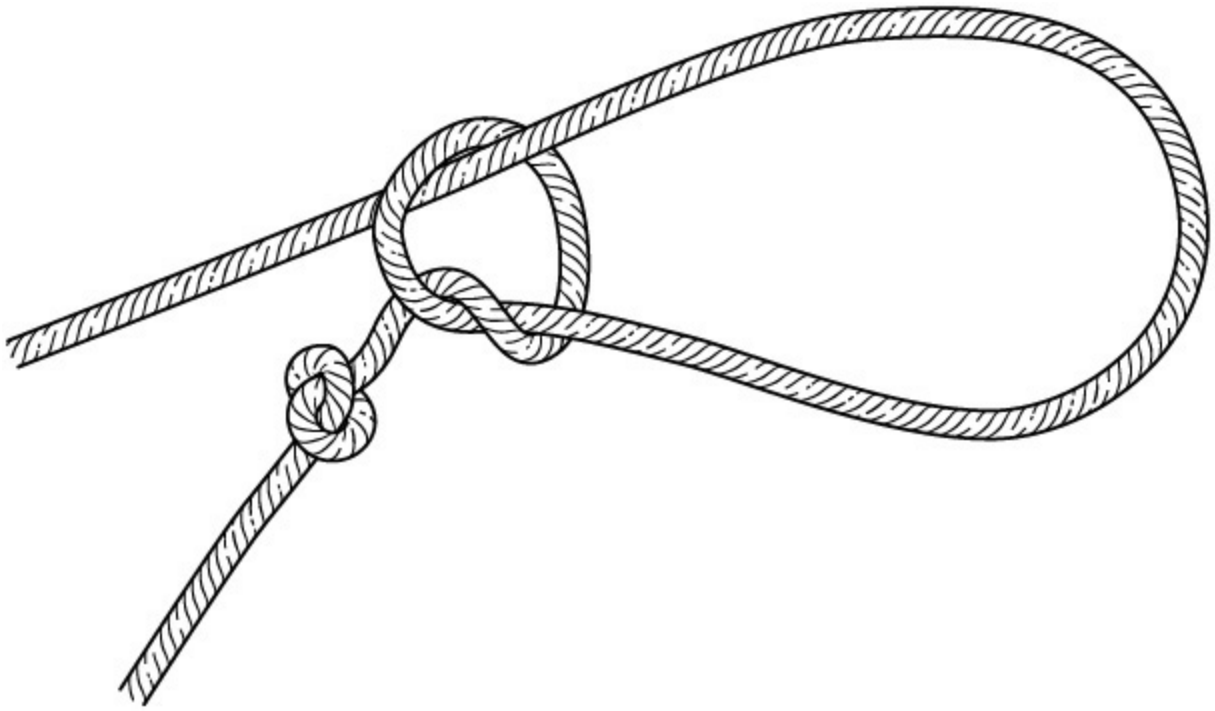
This knot is a self tightening–style knot that can be used in a variety of situations, for everything from attaching toggles with a stop knot to attaching one line to another for the purpose of hanging something from a toggle. The lark’s head knot is formed by two simple loops. However, this knot will slip if pulled under a very heavy load side to side (unlike the prusik knot). It’s great for tarp adjustment lines, especially when using two ropes of different diameters, with the lark’s head being the smaller cord. I consider this the second most versatile knot for use in the woods.



Lark’s head knot

JAM KNOT

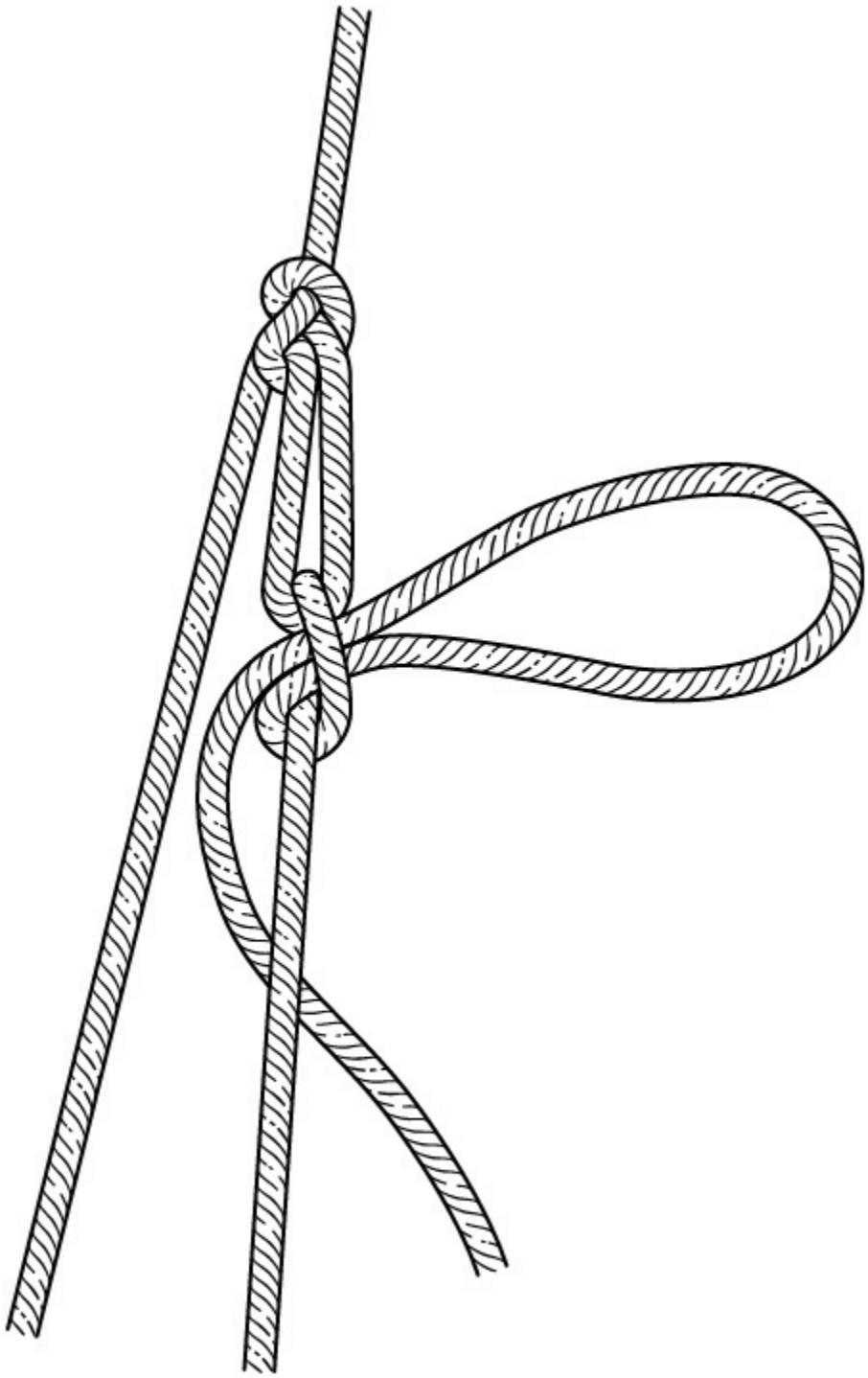
The jam knot is a slipknot that, when used in conjunction with a stop knot, jams a loop of line to tighten around an object. This knot is easily released by pulling the tail on the stop knot portion of the line. This is one of the most useful knots for its adaptability.



Jam knot

TRUCKER’S HITCH

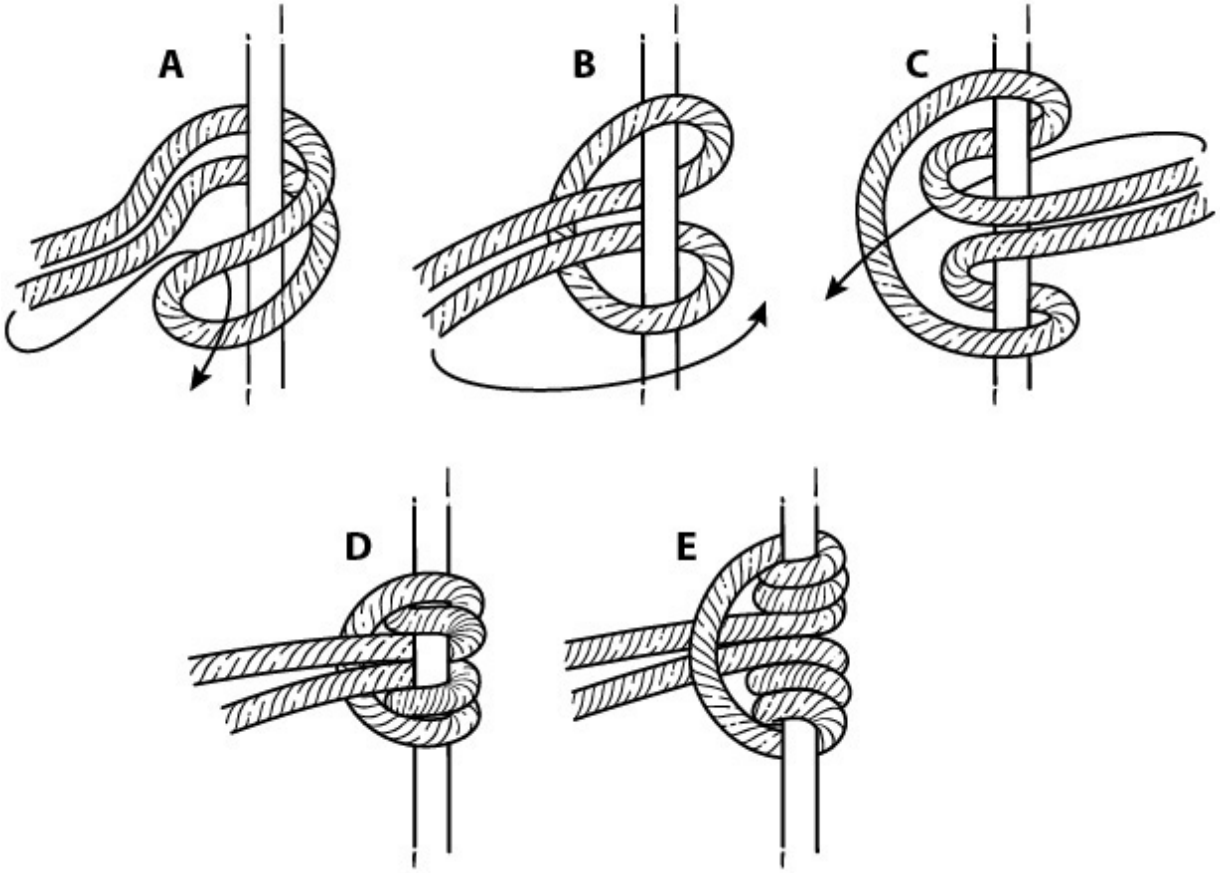
A combination of two slipknots, this knot is used for putting a line under tension and keeping it taut. It can be used for any application when a line must be drawn tight but will still easily release for adjustment or recovery.



Trucker’s hitch

PRUSIK KNOT

The prusik knot is used to attach a loop of line to another line of larger diameter. The loop will tighten when tension is placed on it, making it tight on the larger line. This is a load-bearing knot that is used for ascending a rope or managing a rope crossing in swift water, as it will easily slide forward or up the rope, but self-tightens again under friction. This is also a knot with which to maintain a taut line connected to a tie-out point for tarps and shelters.

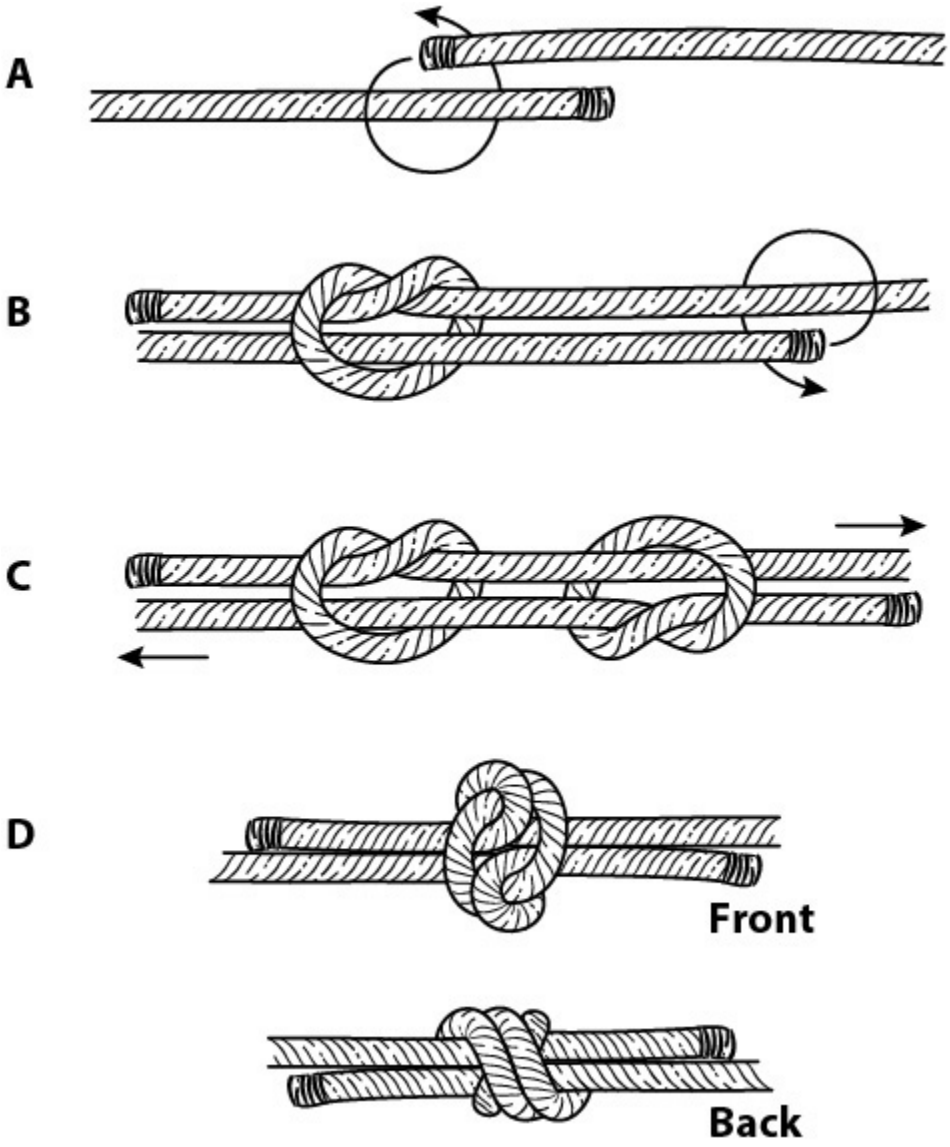


Prusik knot

FISHERMAN'S KNOT

These knots are simple overhand knots used to create a loop of line from a single piece. This is a slipknot as well and tightens against the opposite

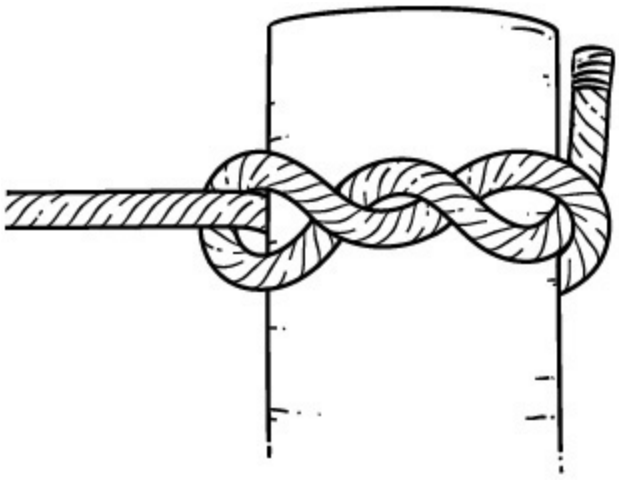
knot when pulled, but it can be loosened easily by pulling on the tails. The loops are very useful in prusik and lark's head configurations.



Fisherman's knot

TIMBER HITCH

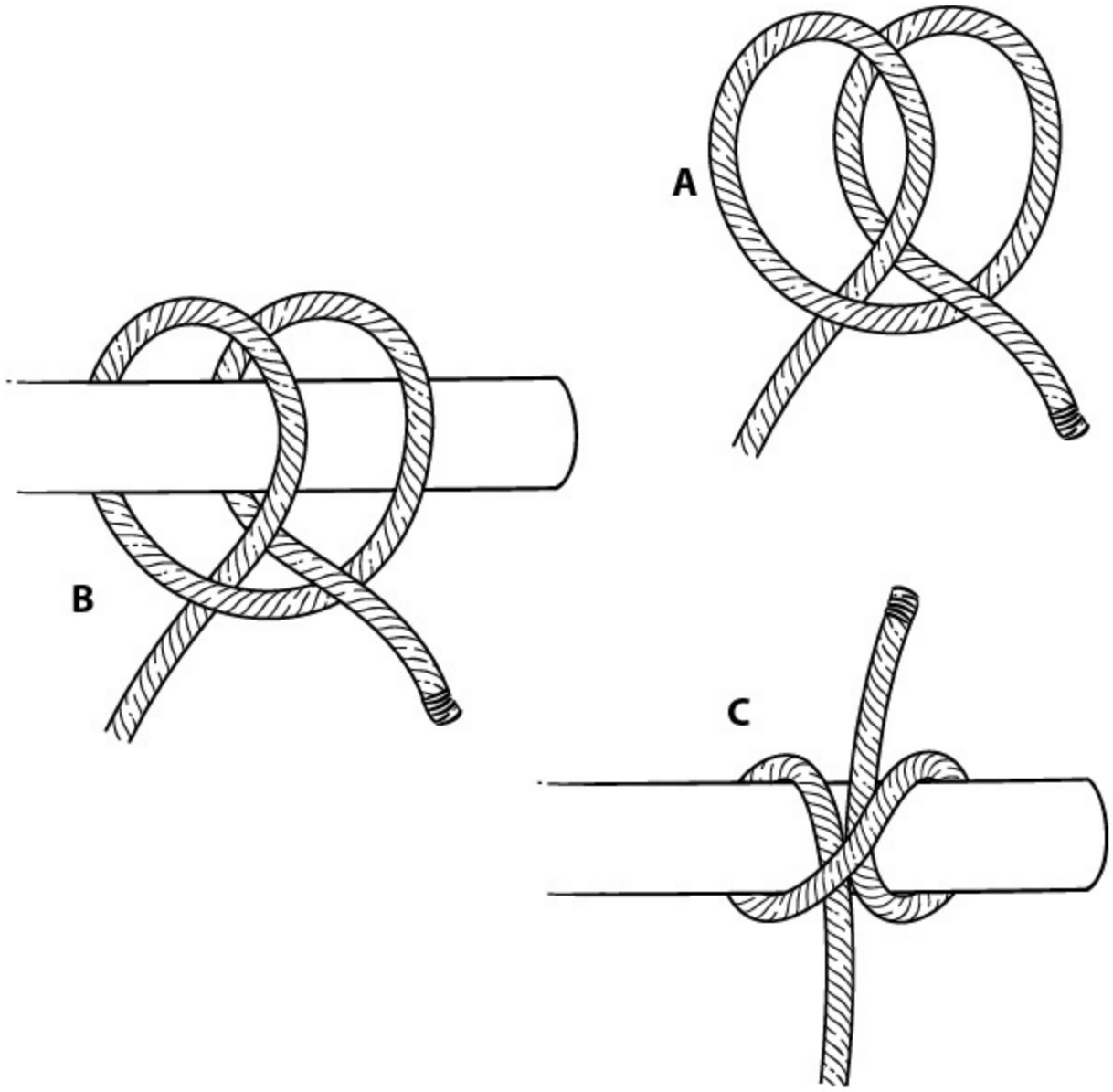
Timber hitches are friction knots. A timber hitch will bind against itself under pressure, and is used in applications of lashings, bow strings, ridgelines, etc.



Timber hitch

CLOVE HITCH

This knot is also one of the four main mariner’s knots, and is very useful if you need to adjust the line after setting. The knot will loosen when either end of the rope is pushed toward the knot, but it is more difficult to loosen in smaller-diameter cords. It is a good ending knot for lashings, as it makes cord recovery possible.



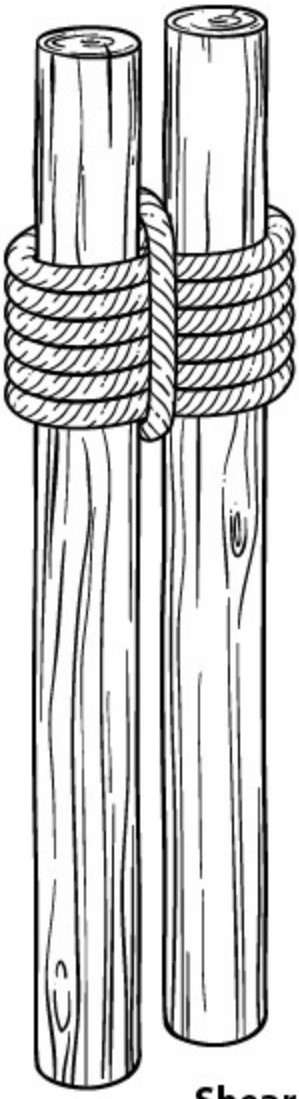
Clove hitch

LASHINGS, BINDINGS, AND TOGGLES

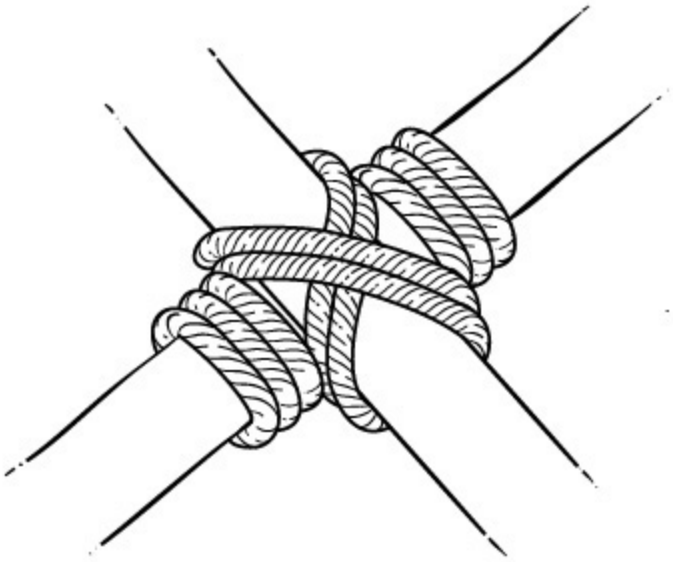
LASHINGS

Lashings are used in constructing objects from the landscape that will be under some load or are meant to support something else. Tripods, pack frames, camp furniture, and A-frame shelter supports all require lashings to

make them strong. For basic bushcraft, you will need to understand the straight or shear lash and the diagonal or cross lash. Shear lashings are used when two objects are tied side by side and then separated, causing the lashing to tighten further. A diagonal lash is used with sticks that cross each other while being lashed, like the top of a Roycroft pack frame.



Shear Lash



Cross Lash

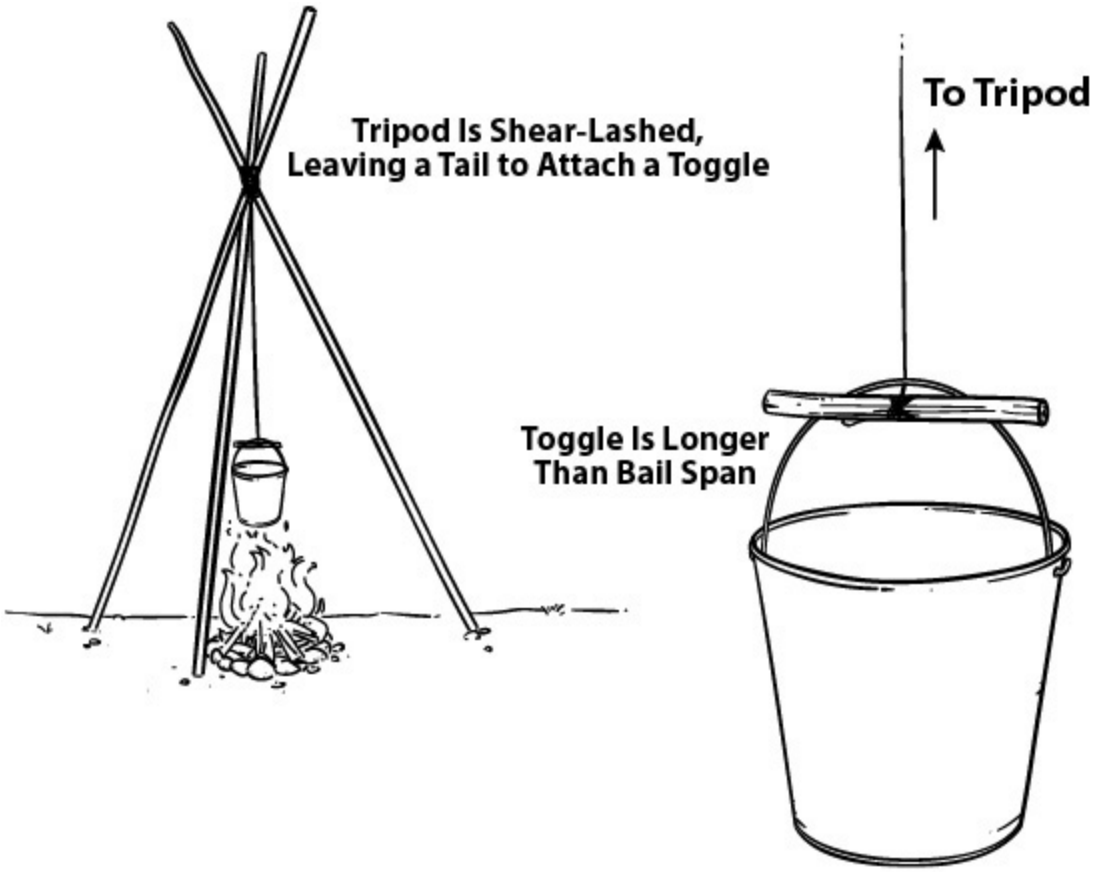
Shear lashing and diagonal lashing

BINDINGS

Bindings are used to keep something from separating or coming apart. You use a binding, for example, to wrap the end of a cut rope to keep the rope end from further fraying. You may also use a binding to haft something, such as a knife blade or arrow point, to a handle. Sometimes bindings are used in conjunction with adhesives and sometimes not, depending on application.

TOGGLES

Toggles are among the most useful items in the woodsman's box of knowledge. They can be used for almost any application, from sheltering to cooking to trapping, or even packing and carrying gear. A toggle is a simple wood stick or dowel (size dependent on need), which is connected to a line by a knot. This can be used as a simple attachment point that is easily moved or removed, and will be load bearing if needed.



Tripod toggle setup

TIPS AND TRICKS FOR ROPE AND CORDAGE

Toggles in rope tied with a lark’s head knot and a jam knot are great for hanging gear such as haversacks, packs, and even guns to keep them off the ground.

Ropes made of natural fiber such as cotton are great for use as a charred slow match. Place a section into tubing such as copper, light a small amount of exposed end, and then blow it out to char the material. You can then re-light the match easily with ferrocerium rod or flint and steel to create a large ember. By feeding the rope up

through the tube, you can extend its burn time. Use about 12" of ⅜–½" rope and a similar length of 6" copper or brass tubing. To put the ember out, just draw the burning end back into the tube.

To make cordage from an animal's rawhide, insert your knife into a section of a stump and thinly slice the hide in a circular fashion. The knife is stationary in the stump and the hide is drawn toward the blade to make the cut. This will give you much longer single cords than trying to cut a piece along the length of hide.

Remember that nylon-based cords, such as parachute cord, will melt if burned. By using only the outer mantle of this cord and melting it, you can make an emergency adhesive or patch for small holes, in items such as containers.

Ensure that any natural cordage is not stored wet; this will cause mildew and break down the fibers.

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Chapter 4
CONTAINERS and Cooking Tools

"The simpler the outfit, the more skill it takes to manage it, and the more pleasure one gets in his achievements."

—HORACE KEPHART, *CAMP COOKERY*, 1910

In every good kit you'll find items for heating water, cooking foods, and making medicinal teas and decoctions. There are many types of containers and cooking apparatuses from which you can choose, and the modern age of ultralight camping gives you even more options than before. Choosing bottles, cups, pots, and pans that are made from the right material is an important decision and should reflect your needs in the bush. Therefore, it is crucial to know the different cookware materials before you make any purchases or venture into the wild.

From the mid-nineteenth to the early twentieth century, the majority of cookware carried afoot was made of aluminum or steel. Earlier explorers used tin, copper, and cast-iron cooking tools as well. Modern technology has produced a wide variety of stainless steel products from which you can choose, as well as super-light titanium cookware. (Indeed, you can purchase cookware that weighs next to nothing; an entire set of modern cookware has about the same weight as a single object made 100 years ago!) However, lightweight materials do not wear well over time. I have found that while

titanium is great for quick heating, it is also very susceptible to warping under direct flame. It may be great if you're going to cook with a camp stove, but for the real bushman who wants his victuals cooked over an open flame, it falls short of the mark.

Stainless steel is strong and resilient, holds heat well, and cooks efficiently when lubricated with oil. It does have one downside: It is very heavy compared to titanium and aluminum. Aluminum is one of the best materials for resilience, heat transfer, and weight. There was much controversy in the 1960s and 1970s surrounding aluminum cookware and products, when scientists feared a link between aluminum and Alzheimer's disease. Recent studies have failed to confirm this, however. Today, anodized aluminums are available that are coated to remove direct contact with foods and liquids during heating and cooking. Steel, stainless steel, and anodized aluminum are all passable choices, depending on your personal taste and preference, but stainless steel is the winner for sheer durability.

WATER BOTTLES/CANTEENS

Containers are crucial to any kit; they are one of the Five Cs because of the difficulty of making a container for water from natural materials in the wild. It's key that you have the ability to disinfect water by heating it; as well, rapid rewarming by heated liquids can be a lifesaver should you become hypothermic. Water bottles are a new item when it comes to woodland tramping. In the days of Nessmuk and Kephart, canteens were available but were rarely mentioned as an everyday carry. Today we're more familiar with waterborne pathogens and thus concerned with the quality of our water containers. Whatever the case, you must ensure the quality of water you drink.

Water bottles that are plastic are a waste of time and money. Any container you choose to carry must be capable of withstanding direct flame. The CDC and the Wilderness Medical Society agree that the *only* 100 percent sure way to disinfect water for safe consumption is to boil it. At normal altitudes of less than 5,000 feet, once the water comes to a rolling boil, that is enough contact time under heat to kill all live waterborne threats. To accomplish this, you must have a metal vessel. I recommend a stainless steel water bottle that holds at least 32 ounces. This means you must boil water four times per day to maintain normal body function. Smaller bottles mean more boiling, and larger bottles become a weight issue if carried full. There are many good water bottles on the market today, but ensure that the one you buy is of one-piece construction for durability in the fire.

There are very few high-quality metal canteens on the market. The only stainless steel canteen I know of is carried by Self Reliance Outfitters and comes with a cup and stove stand. The aluminum canteens on the market are not anodized, nor are they as durable as stainless steel.

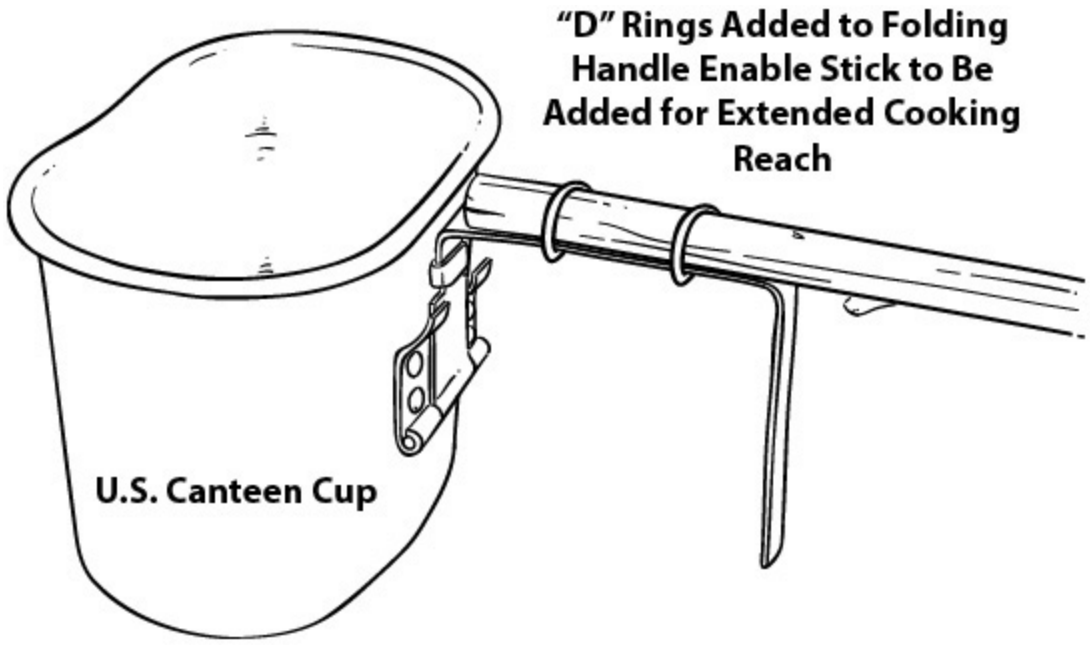
You can use a toggle and string to suspend a water bottle or canteen over the fire or to remove it when heating is completed. To accomplish this, tie the toggle with a clove hitch off center a bit. This will allow the toggle to pivot into place and out of place easily when not under tension, but lock into the shoulders of the bottle when suspended.

CUPS

Cups are available in all the same materials as bottles, and many are made to nest on the bottom of the bottle itself. Some cups are available with a stove stand. Any cup you carry is a personal choice. Many woodsmen of the past considered their cup to have special meaning; their cups would help

“smooth it” in the woods. Noggins or **kuksas** are cups generally made from wood, although there are composite and ABS plastic versions available as well. Original Swedish kuksas were made of sturdy, olive green plastic. Some metal cups have measurement markers either engraved or indented in them, which makes them a good choice for camp cookery.

Canteen cups are mainly made of stainless steel, but handle configurations will vary from a folding single strap handle to butterfly-type handles. Single strap handles make the cup more stable on the ground, and they can be easily modified by adding “D” rings on the strap. This will make it possible to add a stick for a longer handle, to make cooking more enjoyable (this is very similar to the Swedish cook sets). Another easy modification to your cup is to drill holes just under the rim perpendicular to the handles and approximately ⅛" in diameter. This will allow you to use a fish mouth spreader as a bail for the cup, making it possible to employ it as a hanging pot. Many lids are available as well for cups (both regular style and canteen cups) to make them more versatile cook pots. A new technological improvement over the U.S. Canteen Cup Stove ring for both bottles and canteens is the stainless steel cook stove. This stove nests under the cup, which allows you to use **Trangia** or other alcohol stoves for heating and cooking in place of fire. (This is especially efficient if you’re stopped briefly at a campsite, or if open fire is an environmental issue.) These items are also available from Self Reliance Outfitters.



How to modify a canteen cup

POTS

Bush pots and cook sets were among the most common items carried by woodsmen of the past, and they're just as important now. These items sometimes nest so that several pieces can be carried in one space within the pack. In his book *Camping and Woodcraft*, Kephart states that for an individual kit, a pot no more than one quart is necessary and that it should fit easily into a knapsack. Swedish cook sets are great to fill this part of your kit, but unfortunately they are difficult to locate. Generally, they are made of both aluminum and stainless steel and come with a stove stand and Trangia stove; the lid becomes a shallow pan or drinking cup, and the main body is a 1.6-quart cook pot or "Billy Can." There are many similar cook sets available from European countries via surplus. A single 1-quart pot should not be hard to find. Zebra makes several sizes in stainless steel, and Self Reliance Outfitters offers bush pots in anodized aluminum as well as in stainless steel at the 1.8-quart size.

If you’re not concerned about a lid for your bush pot, you can make one out of any stainless milking-style bucket or another metal container that is food safe. Drill bail holes near the rim of the container, using #9 trapping wire for a bail. The pot will become a familiar friend around the fire at night, and you will find after some time that anything cooked in your old friend tastes better. The bush pot provides a good dry storage space in the pack if it has a secure lid, and it can be a great place to keep fire-starting implements. A cook pot of some sort and a stainless steel bottle and cup gives you a pretty reliable combination for any condition.

POT HANGING

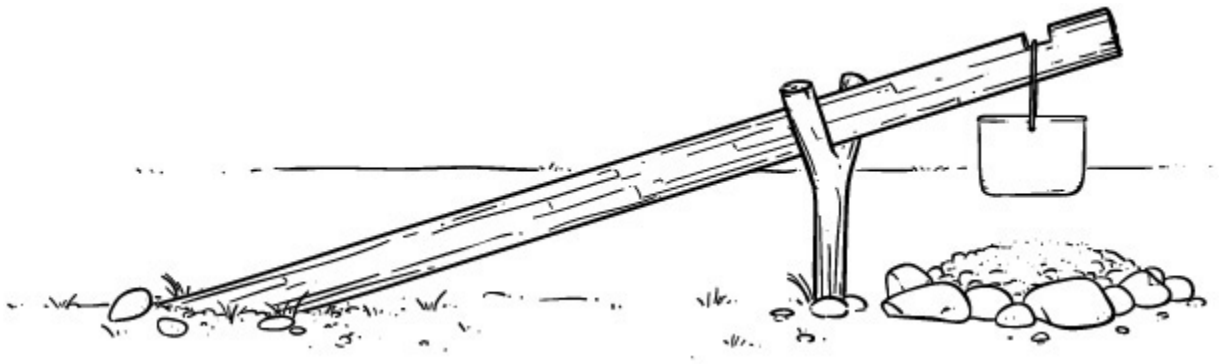
There are several ways to hang a bush pot over the fire for cooking or water heating. The most useful are the tripod, the crane, and the adjustable pot hook.

TRIPODS

Tripods are made by shear lashing three sticks of equal length, about 1½"–2" in diameter. These sticks should be wedged or pointed on the non-lashed end to help keep them from slipping on wet ground or snow. Leave enough length on the cordage so that after lashing, you can lash a toggle to the line, which you can adjust by wrapping over the tripod ends to vary the pot height over the fire. The toggle should be longer than the top span of the bail so as to hold by wedging. Lash the toggle using a V notch and a clove hitch knot. You can easily adjust the height by small amounts and move the legs of the tripod from side to side to control the distance of the pot from the flames. Don’t fuss with the cordage or pot while you’re moving the tripod.

CRANES

There are many types of **cranes**; some are fairly simple, others are more complicated affairs. Simple is always best, and most of the time it's more robust. The most basic crane involves a stick and fork. The long stick is sharpened on one end and notched with a log cabin notch on the other. Drive the point of the long stick into the soil, then place a stick with a Y fork underneath to hold the stick in place. These pieces can be adjusted to increase or decrease the angle raising or lowering the pot. The pot is suspended by the bail from the log cabin notch, which keeps it from slipping down the stick.

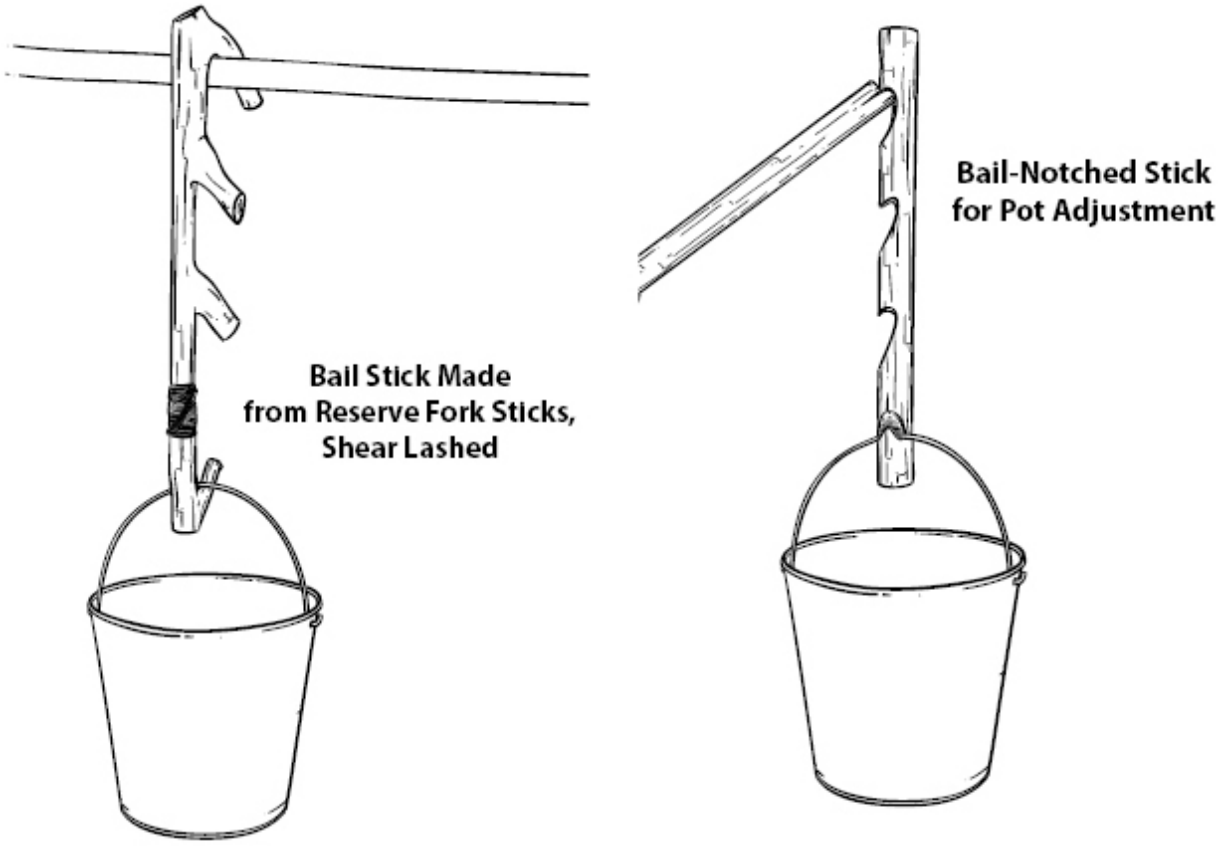


Simple pot crane

POT HANGERS/BAIL STICKS

Another method of suspending pots is by using a pot hanger, or **bail stick**. This stick should have multiple adjustment points to either raise or lower the pot on either a cross stick, two forks driven into the ground a few feet apart with a horizontal stick across the middle, or a crane with a flat angle on the top and divot to mate with the bail notches. If you use a cross stick, then you'll need several forks within the stick for adjustment. In the end, it is generally easier to carve notches for this task than find sticks in which such forks or notches naturally occur. Also, remember: When using forks for making anything, don't use an actual forked branch, as these are

prone to split. Rather, use a cutoff where another branch is growing from the tree so that you are pounding on a straight downward plane, and always split out the area to be struck with an axe to prevent it from mushrooming out.



Pot hangers

SKILLETS

A skillet, a shallow cooking pan, gives the traveler the ability to fry foods as well as providing a plate from which to eat. Of course, we would not need the pan at all if we were satisfied to eat soups from the pot, ash cakes from the fire, or roasted meat from a green stick over the fire. But do you really want to do that? The pan gives us the ability, when used with some

animal fats or grease, to fry our foods. For the longer journey, something fried can be a nice change for the palate.

The Swedish cook sets mentioned earlier have a lid that becomes either a shallow bowl or a skillet. However, if you don’t own one of those sets, there are many skillets on the market made of aluminum, coated aluminum, stainless steel, and steel. It pays well to carry an extra pan because of its versatility. Try to get one that has a folding handle of some sort, or one with a socket into which you can insert a stick. If you’re just looking for a plate either to store food while something else cooks or to eat from, many pot lids can be used for these purposes as well.

MEAT ROTISSERIE

You can fashion a simple meat rotisserie by using another forked stick as the horizontal between the two forks. Cut a point in the stick on the opposite end from the fork and then split it up to about 2" from the pointed end. Push the ends of the split stick through a piece of meat, then lash the splits together to squeeze pressure on the meat. Rest the rotisserie on two vertically forked sticks you’ve stuck in the ground on either side of the fire so the meat can be rotated when desired for even cooking. If the meat is a game animal, slide skewers through the meat and the forked stick to stabilize and hold the rib cage open; this will result in more even cooking.

BUSHCRAFT TIP

You can make almost all the cooking tools you'll need from natural materials, other than a bucket for disinfecting water and boiling meat. All of the cranes, pot hangers, and tools for food handling discussed in this section are made of sticks.

PLANKS

Planks are slabs of wood crosscut from a larger piece and used as a cooking surface for foods such as breads and bannocks. These planks should be of a non-resinous wood so as to not affect taste; hardwoods are also preferred so that the food can be moved close to the fire without risk of burning the wood while the pastry is cooking. You can use planks for cooking almost any breads or bread-related food, but the batter must be a bit thicker, as the plank is generally angled on another piece of wood or stone to expose the pastry to the heat. It is then rotated and maneuvered to take advantage of the best slow cooking heat from the coals and fire.

TOOLS FOR FOOD HANDLING

You won't need more utensils than the sheath knife and jackknife, as you can fashion any other utensil with these tools. One of the handiest items you will want is a scooping device for getting cooked food from the pot to your mouth. Many foods and liquids can simply be consumed by drinking them straight from the container, but if you want a spoon, it will not take much effort to carve one. Take a split branch about 8" long and 4" around. The split can be carved into a handle on one end, and either burned with coals from the fire to create the bowl or dished out with a knife. You can make a

spatula in the same fashion; follow the same procedure as the spoon, but instead of hollowing out the bowl, cut the end flat. If you find that you need a fork, a simple forked stick will do the job, as well as any metal fork. (This might be necessary if you do not wish to eat your meat from the stick cooking it over the fire, or if you need to get a meat chunk from a pot.) If you need tongs, creating them is a simple project. Use a green branch, and cut in the middle of the branch. Then, bend the green branch in half. A simple stick will work for stirring sugar into tea or coffee.

When it comes to the actual cooking, flat rocks free of moisture can make a great grill top. Depending on the thickness of the stone slab, you can cook anything from eggs to steak on stone. Using stone as a fire backing will also hold good heat for cooking with other methods, such as a rotisserie. Stones arranged around a fire can be used for anything from pot or skillet warmers to actual baking.

CAST IRON

Cast-iron cooking has been the standard for good campfire cooking since the days of the pioneers. They say that nothing cooks like cast iron, and a good seasoned cast-iron skillet or pot is a family heirloom. The main issue with cast iron, however, is the weight. Unless you have some sort of conveyance (such as a canoe, a horse, or an ATV), you will weigh yourself down dramatically with even the smallest piece of cast-iron cookware. However, if you have the choice, cast iron provides ease and versatility in cooking around the camp or cabin. A 2-quart Dutch oven and a skillet in which the oven lid will fit is about as good as it gets for camp cooking.

BUSHCRAFT TIP

If you want your cast-iron pots and pans to stay seasoned, avoid washing them with soap. (Seasoned means the pores of the iron are saturated and filled with oil and grease; this makes the cookware nonstick as well as adding to the flavor of the food cooked in it.) When you're finished cooking with a nicely seasoned piece of cast iron, wipe it clean with a rag and put it away. If something gets stuck to the surface or you accidently burn food to the metal, fill it with water only and boil it over the fire, then wipe it and dry thoroughly. Never use a scrubbing pad or soap on cast iron. Most new cast-iron pans come pre-seasoned. If yours is not, or if you buy used and it is rusted, clean the rust with a piece of steel wool, wipe down with a heavy amount of cooking oil or lard, then heat over a fire. Repeat this process as needed until the oil stands in the pan. At this point, you can pour out the excess oil and wipe it down as usual.

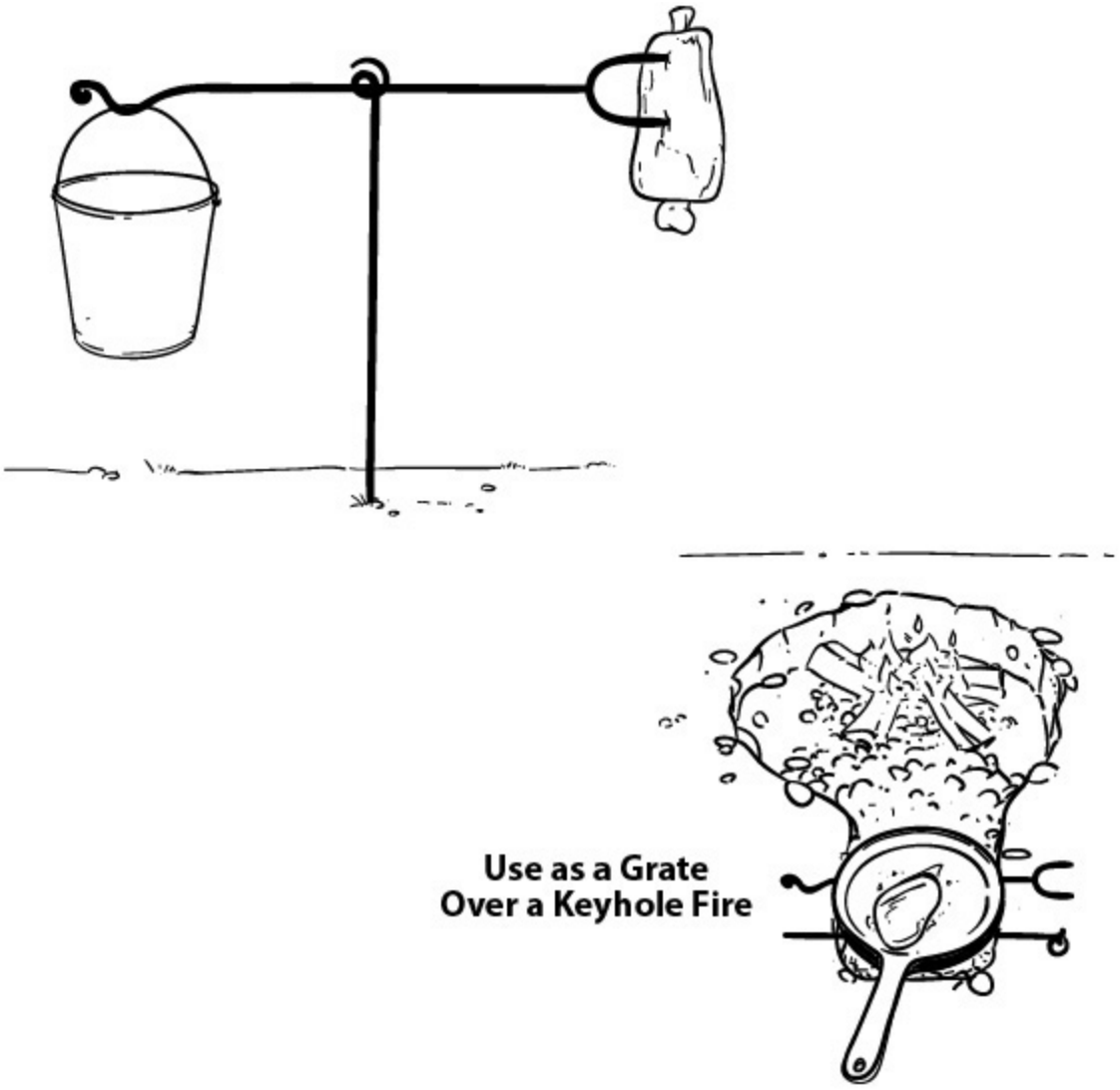
COOKING IRONS

There are many types of cooking irons and implements made from ironwork by blacksmithing; the types covered in this section are the most useful and versatile for camp use. Iron is heavy, so if you're going to carry these, most of the time you'll need a conveyance of some sort.

"Squirrel cookers," as they are called, are a very useful type of cooking iron, made up of two pieces about the length of a bedroll. They can be used for cooking chunks of meat, for hanging a pot over the fire, or as a poker to stir the coals and arrange wood in the fire. Another use for these two irons is as a skillet grate if placed over a keyhole fire pit. To use the squirrel

cooker as a pot hanger or meat fork, place the pot hanger end of the iron through the pig tail of the other iron, (that is, the part of the iron curled like a pig's tail) and then place the other end of the pig tail piece in the ground as an upright. This then becomes a crane that can be rotated for use as a pot hanger or meat fork, depending on which side is over the fire.

Another type of iron that is useful in camp is very similar to a wooden rotisserie. It features two uprights and a cross bar placed horizontally through the eyes of the two uprights. From this, a combination of hooks and chain or trammels are used to adjust pots over the fire or cook meat on the cross bar. These setups are a bit impractical for normal use, as they are heavy. They are very useful, however, if you can find a way to easily transport them.



Squirrel cooker

STOVES AND BURNERS

The terms “stove” and “burner” really refer to two different things. “**Burner**” refers to the unit that produces the fire. A stove is the stand, grated material, or component on which the pot or cup rests *over* the burner. (The Trangia and alcohol “stoves” currently on the market are actually burners.) To avoid confusion, I will refer to burners in the following text as

stoves, and stoves as “stove stands”—that way, when searching today’s market, you will not be confused.

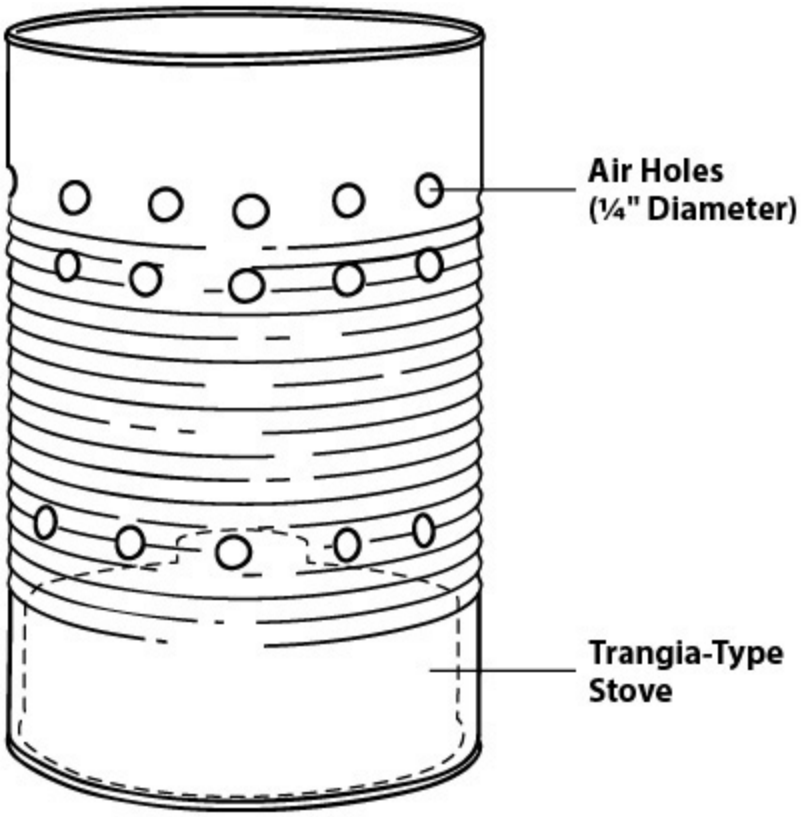
STOVES (BURNERS)

All alcohol stoves on the market, whether they are penny stoves, Coke can stoves, or traditional Trangia stoves, work on the same principle: an enclosed material wick (usually asbestos) is sealed in a confined space with holes at the bottom of the container for alcohol to wick in. There is a reservoir in the center into which liquid is poured so that it seeps into the wicking holes. After the alcohol is lit in the reservoir, which can be accomplished with a ferrocerium rod or open flame, the fumes rise from the wick within the enclosed vapor chamber and burn through tiny holes in the upper rim of the device, causing it to jet. Some people use different accelerants other than straight denatured alcohol in the devices, but I do not recommend this practice, since they will either clog the outlet holes or smoke heavily.

Most of the Trangia stoves that are the original design used in the Swedish cook set will burn about thirty minutes on one fill of alcohol, and boil one quart of water in about five minutes with a good stove stand. New model Trangia stoves on the market are passable as well, but the originals are the most robust. Many of them are available on the web for between $20 and $100 and will last a lifetime. The one component of the Trangia you may need to replace is the “O” ring used to seal the lid, allowing the stove to be stored in your pack when filled or partially filled with alcohol. The “O” rings can be purchased online, but you can also find comparable ones at most hardware stores. These stoves have stood the test of time and are far less susceptible to problems than are modern multi-fuel backpacking stoves.

STOVE STANDS

Stove stands are used to raise the pot or cup being heated above the flames of the stove (burner) to provide space between the burning jets and the bottom of the object, allowing oxygen flow. There are many small folding versions of these stands available; however, many do not provide a windscreen. The stove stand that comes with the Swedish cook set was designed as not only a stove stand but also a windscreen that nests with the set, eliminating the need to carry two separate pieces of gear. The older stove stands made for the U.S. military canteen and cup are an open sleeve design that nested on the cup, featuring air holes to provide oxygen. Robert Simpson of CanteenShop.com recently designed a stove stand for the U.S. canteen cup that also provides a grill top to the stand and screen. Working with Self Reliance Outfitters, the folks at CanteenShop have also made stove stands for cups, canteen cups, and bush pots in stainless steel, which provide all of the benefits mentioned here. Keep in mind that any stand you use needs to nest within the cook set well, so it does not take up extra space in the pack. You can make a quick stove stand from any large soup can by cutting off the top and bottom of the can and then drilling several holes around the top and bottom third of the can to allow oxygen flow.



Simple stove stand made from a large soup can

TIPS AND TRICKS FOR COOKING IN THE FIELD

When you’re cooking any type of meat, boiling will save the most nutritional value from the animal. Drink the broth as well; it contains critical fats.

Any stones used for cooking or placed directly within a fire should never come from creek beds or rivers. Even if they appear dry, they can still hold moisture that will cause a fracture when heated; they can create great danger from flying debris when they explode.

Fires are for warmth and coal beds are for cooking. Always let fires burn down to develop a large coal bed for cooking needs.

Always pick fire locations carefully, bearing in mind the wind direction and strength so that the flames do not get out of hand. When you’re leaving an area, fires should be completely out with no smoke coming from the coals. Crush carbon completely and scatter it to make the smallest impact on the land.

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Chapter 5
COVERAGE

“A pleasant stopping-place is seldom far to seek in a hilly country that is well wooded … In a level region, whether it be open plain or timbered bottom land, good water and a high and dry site may be hard to find.”

—HORACE KEPHART, *CAMPING AND WOODCRAFT*, 1919

Choosing proper coverage for your expeditions will depend on your environment, the season, and the duration of your stay in the wild. A well-constructed shelter made of durable material can make the difference between a safe, warm, and dry night’s sleep and a potentially life-threatening situation. To help you choose the best options for your kit, this chapter details many coverage options, from types of tarps to sleeping bags and blankets, and even natural shelters you can construct on the fly or in emergencies. You’ll also learn essential skills for treating your coverage materials and creating tents, as well as folding and storing options for carrying shelters with your kit. From modern military Modular Sleep Systems with bivvy bags to traditional wool blankets and fire lays, here you’ll find the information you need to choose and maintain essential cover elements—another one of the Five Cs necessary to create a microclimate of protection from the elements.

TARPS AND TARP TENTS

The biggest advantage of the tarp or tarp tent is that it provides a no-floor footprint. A waterproof floor in a tent can cause several problems:

> Water can run under the tent and leak through; then the waterproof floor will form a holding bucket for this water.
> If water infiltrates the tent from the top, the water will be contained by the floor.
> With no airflow from under the tent or no place for moisture to escape, floored tents can become a nightmare of trapped condensation throughout the night.

Tarps and tarp tents are easy to carry and pack. They are also the most versatile for different setups, depending on conditions and seasonality. The most common materials for these items are polypropylene, silnylon (silicone impregnated nylon), canvas, or oilcloth. All of these materials have certain advantages, as well as disadvantages.

POLYPROPYLENE AND SILNYLON

Polypropylene is a lightweight material that can be purchased very inexpensively; however, its poor longevity and durability make it unsuitable for anything other than the short term. A seasoned camper would never want to own this for an often-used sheltering device because of its potential impact on the environment. Another problem with this material (which can be an issue with any material) is that tarps made from it always use grommets or metal rings for tie-out options, not actual loops sewn into the material and reinforced. It is always best to have established loops or actual

tie outs instead of grommets, since the former offer better support and less stress on the material.

Silnylon, a nylon material impregnated with silicone for waterproofing, is by far the most popular material used today for shelter tarps and flies. The main advantage of silny is that it is very light and can be crushed into a very small package for ease of packing. The main disadvantage of this material for the bushcrafter wishing to spend a lot of time in the woods is that it is very susceptible to fire. A lot of companies are still using grommets in silny as well, which cause failure when the material is under stress. Many good silny tarps are available if you desire to use them, but keep in mind that, as with all other critical elements of your kit, you need them to be multifunctional and durable. You will never drag a deer out of the woods on a silny tarp without destroying the tarp.

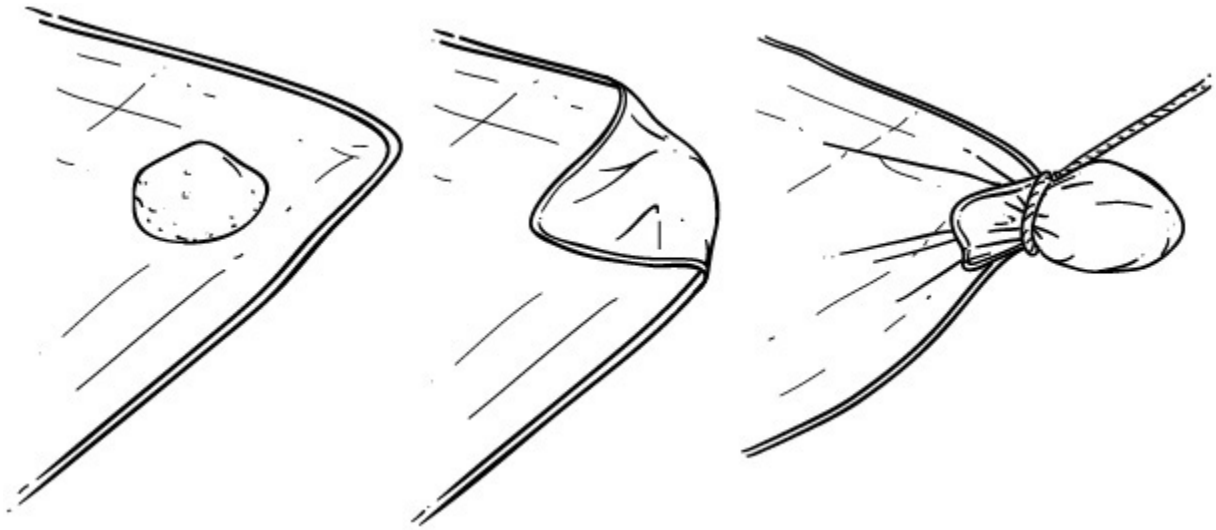
CANVAS

Traditional **canvas** is one of the most resilient materials to use as a tarp or tarp tent. Today, many canvas tarps are more fire retardant and mildew resistant than in the past. This makes canvas a prime material for long-term use as a shelter (cover) component. The main disadvantage to canvas material is weight; anything over about 7' × 7' is too bulky for any use without some sort of conveyance. Many canvas tarps have well-sewn-in tie-out points, but you still need to avoid grommets.

Tarp tents of 8' × 8', 9' × 9', or 9' × 12' will be of the most use to the single traveler. I am very partial to Tentsmiths.com's Egyptian oilcloth for lightweight carrying and durability. If you are using this tarp for a season, it is important that it be resilient under varied weather conditions.

MAKING A CANVAS TENT

You can make a simple tarp tent from any painter's-type canvas drop cloth. A size of 9' × 12' will give a good number of options for setup, and it can be treated easily with products such as Kiwi Camp Dry or Thompson's Water Seal for quickness. You will need tie-out points on this canvas for driving stakes and running guy lines. Lay the tarp out on the ground; for each corner, take a marble, stone, or wad of leaves and bunch the fabric around this object, tying it off and leaving tails to form a loop. You will want one of these in each corner to start. After this is accomplished, fold the tarp lengthwise, and again make loops, not only at the corners but at the center as well, evenly spaced between the corner and center. Then, fold the tarp the opposite length, doing the same step as before, including the marble, stone, or bunch of leaves, adding a loop at each corner and at each side of the center, evenly spaced. Once this is complete, fold the tarp at its widest point halfway to center from both ends, and again make tie outs on the corners. You should now have seventeen tie outs for making several different setups easily. Tarp tent setups will be explained further in Part 2.



Tarp loop attachments with rocks

OILCLOTH

Oilcloth tarps are well suited for longer-term use, and because quality ones are made from high-thread-count cotton, they are fairly lightweight. An oilcloth tarp of 8' × 8' is easily manageable for packing and carrying. The only real disadvantage to oilcloth is that it will burn if exposed to direct flame. Some oilcloths are heavier than others, depending on the type of cotton used in its manufacture, but good Egyptian cotton is light and durable. Make sure that you have tie-out loops and not grommets.

MAKING OILCLOTH

You'll need:

- Painter's drop cloth of fabric weight more than 8 ounces
- 1 quart of mineral spirits, available as paint thinner at most home improvement stores
- 1 quart of boiled linseed oil, available at home improvement stores
- Concrete pigment (optional)

Machine wash and dry the drop cloth; this will close the fibers.

Mix the mineral spirits and linseed oil in 50/50 proportions. You will need this combination of chemicals. The linseed oil waterproofs the fabric, and the mineral spirits allow the oil to dry. If you use straight linseed oil, the fabric will not dry and will remain oily and sticky.

Shake the mixture well.

Add any type of concrete pigment to the mixture for the color desired.

Hang your tarp from a fence or line, and then brush-paint the mixture into the tarp, covering all areas evenly. Make sure it is

saturated well.

Leave the tarp hanging until it dries, which should take about forty-eight hours. The smell will take about a week to disperse from the oilcloth. WARNING: Linseed oil is flammable, so be careful not to expose this tarp to direct flame.

GROUND PADS

There are many commercial **ground pads** on the market made from a variety of materials. Blow-up mattresses are prone to punctures, although they will fold up smaller than a foam pad. However, a foam pad is very resistant to tearing from sticks and roots, and is easy to dry when the ground is moist. I prefer an exercise mat from a local box store; the mat is black, so it absorbs heat. These are more flexible than traditional sleep mats, so they can be used for first aid purposes as well, such as stabilization of a dislocated knee or broken bone. Make sure that whatever you use will suit your purpose. Any ground pad must be thick enough when compressed to battle the effects of conduction (equalization of ground temperature to the body, causing heat loss), and yet be manageable for carry outside the pack.

BROWSE BAGS

A **browse bag** is made from lightweight material, which is sewn across one end and up one side, creating a body-length bag that can be used for a mattress when filled with browse (leaves or debris). Because the bag is made from a lightweight material, it can fold up small and take up little room, or add little weight to the pack. Browse bags can also be used as emergency sleeping bags and as an additional way to stay warm. The best thing about these bags is that they prevent conduction of cold temperatures

from the ground; unlike ground pads, they take up little room in the pack. Be aware that it will take some prep time to set up your browse bag for proper use.

EMERGENCY THERMAL BLANKETS

Emergency thermal blankets are very useful within any kit. They can act as a heat reflector, blanket, ground pad, or tarp. Most of the reusable blankets (which is the type you should carry) are 5' × 7'. Most emergency blankets have at least a grommet hole in each corner. While this is not the most desirable method of attachment to a solid object for tie out, it can come in handy for emergency use. These blankets are a great, light resource to create a moisture barrier on the ground in your shelter. Place the reflective surface up in the winter and down in the summer for maximum efficiency.

HAMMOCKS

Hammocks have been used for hundreds of years, although they are fairly new to the modern woods tramper. Hammocks give the advantage of getting you off the ground above the critters, and when combined with a good tarp, they require little attention to keep dry—even in a driving rain. They are also very lightweight and packable, are quick to set up, and provide a very comfortable sleep. Most modern hammocks are made from nylon-type parachute materials, but they can be made from rope as well as canvas.

SETTING UP YOUR HAMMOCK

Hammock setup is not a complicated affair, and that makes them preferable when you’re traveling quickly or trying to not add more weight.

Most modern hammocks are tied off between two trees, using either heavy rope or strapping material such as nylon webbing. Most come equipped with carabiner clips that you clip to the straps. How taut you make your hammock depends on your personal preference, but keep in mind that a hammock's straps will stretch when first laid in, no matter how tightly you tie them to begin with. Some folks prefer them fairly tight, as they feel this gives better support when sleeping, but others prefer some slack.

Flying a tarp above the hammock for a waterproof roof makes a fabulous, easy camp outfit, especially in mild temperatures. You can use hammocks in colder environments or seasons, but special care must be taken to avoid convection because of the risk of hypothermia. To accomplish this, hang a thick sleeping pad or under quilt below the hammock. This will trap air between the hammock and the quilt, but not allow convective breeze to touch the bottom of the hammock that is against the body. You can also use a sleeping bag or wool blanket in conjunction with the hammock in colder weather. Pitching your tarp lower will also trap more heat that's released from your body.

SLEEPING BAGS

You will always stay the warmest by trapping warm air and sealing it into a space around your body. To this end, if you can confine the heat that naturally escapes from your body, you can stay warmer for longer periods. **Sleeping bags** help you do just that.

Sleeping bags are now the norm of camping. These days there are many types of synthetic material available for insulation fill and creating loft, or trapped air space, in these bags. Down- or feather-filled bags are available as well, and these varieties are very warm. However, these bags have a major downside when it comes to condensation and moisture collection:

Over a few short days in the field, they become saturated with moisture from your body. If you practice bushcraft in dry and less humid areas, a good canvas-shelled and down-filled bag will be a welcome bed on a cold night.

MILITARY MODULAR SLEEP SYSTEM (MSS)

We now have synthetics for insulation, and few alternatives beat a **military Modular Sleep System (MSS)**. With a Gore-Tex bivvy (a waterproof outer shell), this is a very convenient short-term option for just about any foul weather, especially if resources are scarce or environmental impact is restricted. In choosing what you need, remember that synthetic bags require drying out on a regular basis—and this may not be feasible, depending on season and geographic location. (For a normal dry environment, a synthetic bag may very well be the best short-term choice for the hunter.)

The MSS consists of an outer Gore-Tex bivvy for waterproofing and two inner synthetic-filled bags, one for lower temperatures and one for midrange temperatures. You can combine these bags in very cold conditions. There are also available a lot of military bags on the market from countries other than the United States, and you can purchase these fairly inexpensively. I have found the Swedish sleeping bags to be very roomy and warm when temperatures are around freezing. Combined with a single twin wool blanket, they make a great combination for less than $50.

BIVVY BAGS

The **bivvy bag** is a waterproof bag that covers your head and sleeping bag. It gives another layer of protection against cold and damp. Many bivvys are actually tube tents in which you sleep; they provide an enclosed breathable space that will repel bugs as well as most weather. Some bivvy

bags, such as those used in an MMS, are Gore-Tex breathable shells that attach directly to the sleeping bag. These are waterproof and add additional insulation to your sleep system.

CARRYING

For carrying purposes, treat sleeping bags as you would bedrolls—roll them up and suspend them from your pack.

WOOL BLANKETS

A wool blanket is by far the best choice for the longer term and for its sheer versatility, but to sleep comfortably with it requires a leaf bed or browse bag, and you may need to have a sizable fire in close proximity to the bed.

BUSHCRAFT TIP

For the wool blanket sleeper, understanding the rule of inverse squares relating to fire and use of log backings are absolutely critical. The rule of inverse squares means that the amount of heat felt from a fire at a given distance is reduced by the square root of that distance when one moves that distance farther away. Think of someone standing three feet from a fire. If the person moves only three feet farther away, he or she will only feel 25 percent of the heat felt at the original distance. Keep that in mind when deciding how close to or far away from the fire you want to set your sleeping blanket.

Many people argue that modern wool-mix blankets will keep you warm and dry while in the woods. This is correct, but you should know that the more wool in the mix, the more effective the blanket. Blankets made of 100 percent wool are water-resistant, flame-retardant, and warm, and retain about 70–80 percent of their insulate value, even when wet. A 70 percent wool blanket will be about 70 percent as effective as one that's 100 percent wool.

Not all wool blankets—even 100 percent wool—are created equal, and you must consider a few things before making your selection. Loom-woven blankets made by hand from virgin wools (that is, wool spun for the first time) will always be superior to machine-made blankets. A looser weave is somewhat desirable in this case, as it creates more loft when overlapped.

Carry one queen-size and one twin-size blanket, as this will offer the most options not only for sleeping but also for outerwear. This versatility gives the wool blanket a great advantage over other sleep arrangements, such as sleeping bags. If you cannot find thick wool blankets, use thinner blankets sewn together. Good Hudson's Bay Company–brand blankets can still be found at thrift stores, flea markets, and on places such as eBay at reasonably low prices.

NATURAL SHELTERS

The skill and knowledge to build natural shelters is the most important thing any beginning bushcrafter can possess. Why? Because adequate shelter is the most critical component for survival in the woods. You can carry many things easily on your person—even without a pack—the loss of which would be at least a serious inconvenience. Cutting tools, combustion devices, and containers can easily be attached to your belt, and cordage can be salvaged or carried in your pockets as well, but adequate shelter is

another story. If for any reason you lose your shelter or it becomes damaged, you must know how to construct one using the materials you have.

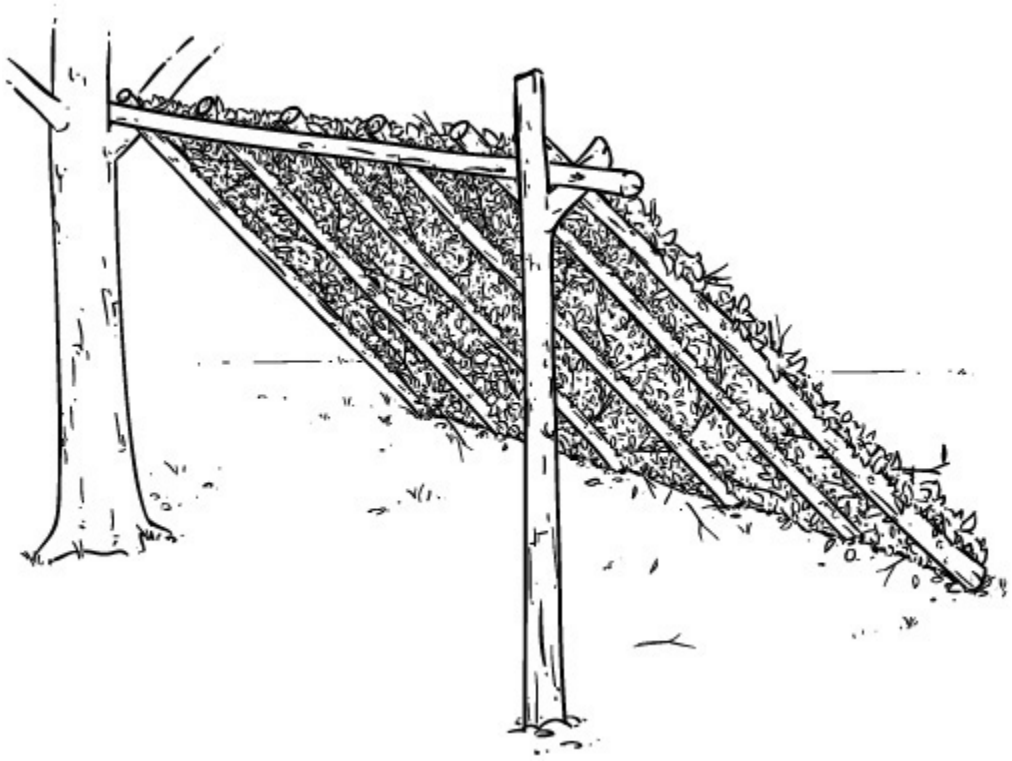
There are many forms of natural shelters you can construct if you are without a decent tarp or tent. However, understanding what type of shelter to build and what materials to use is the key to controlling conduction, convection, and radiation. When building any natural shelter, the first consideration is the structural material that is available and workable in the area. Deadfall materials have the least impact on the environment, take the least physical effort, and are the least time-consuming to gather; however, you must ensure that they are structurally safe. Though they are dead, they may need to support considerable weight by the time you are finished. Any main supports (which should be at least 3" in diameter) should be cut green, if at all possible. External framework not supporting total weight can be constructed from dead fallen material with little risk.

There are three main forms of natural shelters: the **lean-to shelter**, the **A-frame shelter**, and the **debris hut**. However, you can construct any natural shelter to mimic a tarp configuration as well.

LEAN-TO

If the weather is fair and you can take advantage of the breeze, a lean-to-style shelter is best. You can make a lean-to by lashing a simple cross pole between trees. Add several more saplings at a 45° angle to the ground on one side, then weave in horizontal vines or cuttings. Once this is accomplished, waterproof the lean-to by adding more cuttings from bottom to top, layering them always with the growth upside down. (This will allow water to be channeled away from the shelter. If any cuttings are placed as they grow, water will collect toward the joints and run down into the

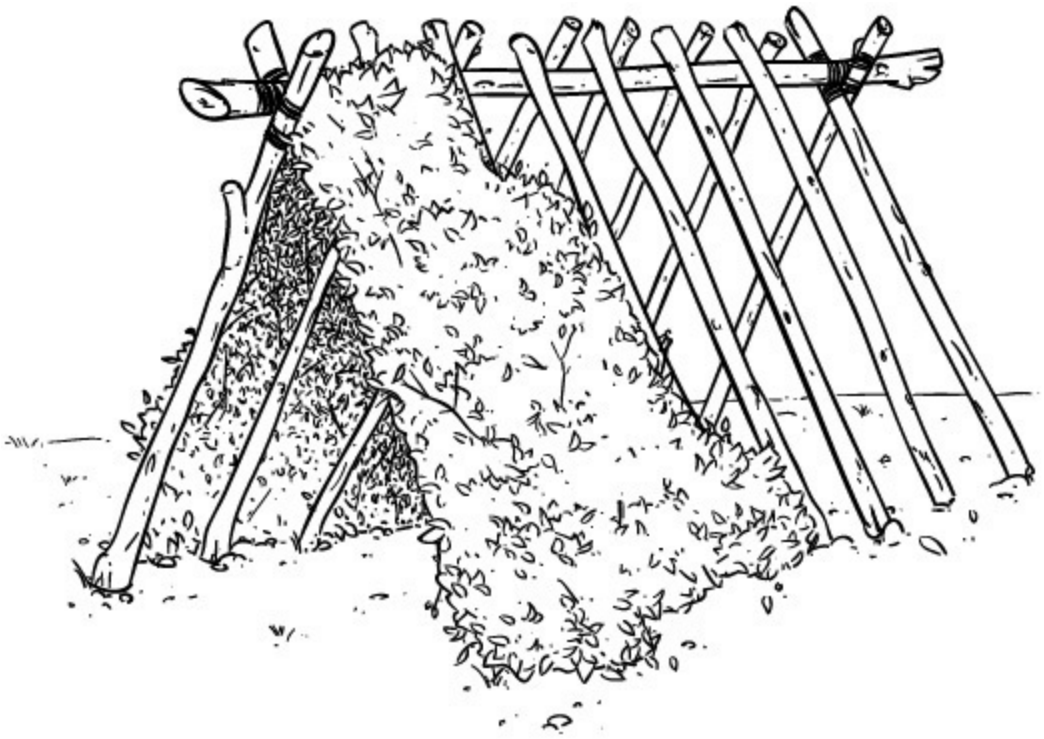
shelter.) Avoid branches that can catch water or rain and drip inside the shelter.



Lean-to shelter

A-FRAME

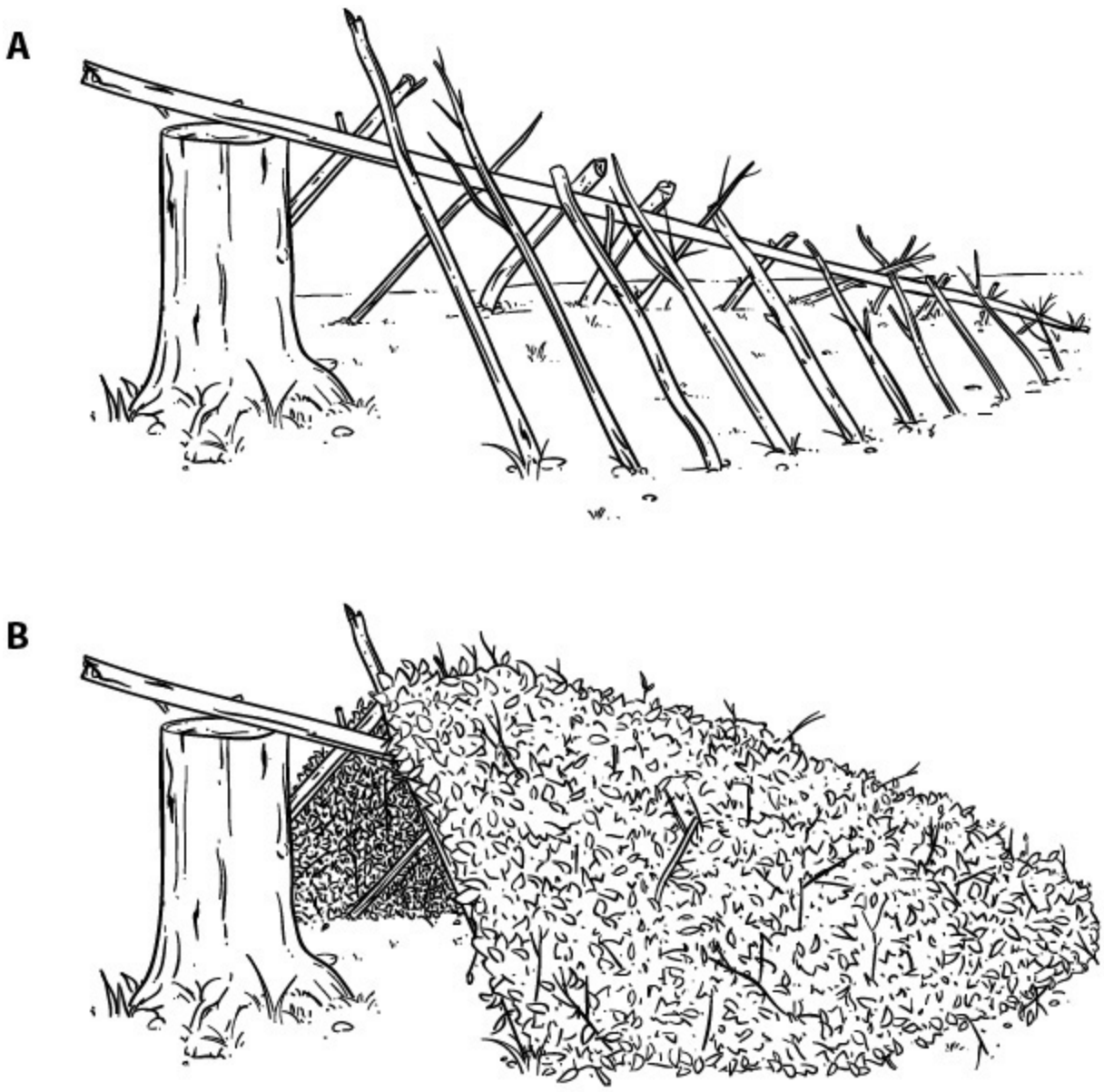
For more inclement or stormy weather, add another side opposite to the first onto the lean-to shelter, creating an A-frame to deflect rain or wind from two sides. Again, leave no branches or supports from the inside sticking out, or the shelter will collect water. The colder the weather, the thicker the thatching must be, and if you want it to have insulative value, it must be at least 3' thick with leaves and debris.



A-frame shelter

DEBRIS HUT

For the coldest of nights, especially if fire is not an option, a debris hut will be a necessity. This is a simple modification of the A-frame, with one end of the ridgepole on the ground, creating a closed triangle structure with a small opening. The key to these types of shelters is to remember that they only need to be large enough for you—and nothing more. You must restrict space in order to maintain heat on the inside, as it will all come from your body and be trapped within. A bedding of leaves and debris on the ground of any shelter should be at least 4" thick when compressed to avoid the effects of conduction. Once inside, you can use your pack to close the hole through which you entered, like a trap door.



Debris hut shelter

TIPS AND TRICKS FOR SMARTER COVERAGE

When using your tarp for sheltering on the ground in colder weather, use debris or snow to help insulate around the edges. This will

reduce any convective breeze from entering in those areas.

Hammocks make great chairs during the day when you set them up on a tripod lengthwise, with an open crossbar on the tripod.

If your tarp requires reproofing for water-repelling properties, a simple solution is to rub the entire tarp with a bar made from two parts beeswax and one part tallow or lard.

When using a browse bag as a mattress, if all available debris is wet, you can line the bag with a 55-gallon trash bag before stuffing to keep moisture from seeping through.

Never sleep closer than one full step away from any fire to avoid bouncing embers.

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Chapter 6
COMBUSTION

"Possessing the means and the knowledge to light fire at any moment is a prerequisite for living and surviving in the bush."

—MORS KOCHANSKI, 1987

From the beginning of time, man has needed fire, not only to warm his body but to cook and preserve his food, to light the dark walls of his cave when recording his hunts, and to give him something to watch as he fell asleep at night. Fire has been used to ward off animals that might otherwise prey on unsuspecting humans while asleep, and to keep away bumps in the night (imagined or real). Today, our needs for fire are no less important: We need the heat from fire for warmth on a cold night, we use fire to cook and heat water, and we use it to make our drinking water safe for consumption.

Since you know you need fire, you will need a combustion device as an element of your kit. There are numerous primitive ways to start a fire—so many that I could write a second volume to cover them—but remember, you are "smoothing it." You can practice your skills and "craft," but you need to be prepared as well. Fire is very difficult to create from only natural materials, especially in some environments, and it requires a high level of skill. There are three reliable methods of ignition readily available today:

The lighter
The ferrocerium rod

The magnifying glass (or “sun glass”)

LIGHTERS

As with any other piece of gear, there are thousands of varieties of lighters available to you. Which is the best? It’s the one that is the most reliable in foul weather, is the longest lasting over time in your pack when not in use, and has the ease of use when needed. The regular BIC brand lighter is the forerunner in this category. Lighters that require adding fluid fuels are prone to evaporation, and if they need parts replaced and are not a throwaway item, they are too complicated to be reliable. For ease of use, it is hard to beat flicking the BIC! Don’t settle for the cheap imitations; get a real BIC, and if possible, get it in orange so you can readily find it.

You should have at least three lighters: one for the pocket, one for the belt pouch or haversack, and one for the main pack. The weight is negligible and the reward is great. The rule of thumb for a lighter or other open-flame device is five seconds to ignite tinder; any further use is wasting a resource.

BIC lighters have one significant problem: They are susceptible to cold. If the lighter itself is below 32°F, it will not light. Keeping one close to the body in a pocket is the best way to avoid this issue. If for some reason the lighter gets wet, it will not light until it is dry again. This can be accomplished by letting it sit and dry out or by removing the front housing and drying the actual striking wheel. Replace the dry wheel to make it function again.

FERROCERIUM RODS

Ferrocerium rods, metal match, misch metal—these are all synonymous terms. A ferrocerium rod is a solid rod made from pyrophoric materials such as iron, magnesium, cerium, lanthanum, neodymium, and praseodymium. Some of these materials have a very low combustion temperature, and when you create friction against the rod, combustion occurs. To accomplish this, you need a 90° sharp edge that is harder than the material of the rod. This harder edge will remove the material and create the spark that is approximately 3,000°F. For use in the woods, it is best to have the largest and longest rod possible, as this will increase the surface area and friction over distance. A longer rod will have more material removed when you strike it, and it will create more burning metal (sparks). I prefer to carry a blank rod that is ½" in diameter and 6" long, with the end wrapped in 1" duct tape. (This creates a handle and acts as an emergency flame extender as well.) Many rods have handles of plastic, wood, or even antler, but unless they are actually drilled and pinned, there is no epoxy that will keep the rod from eventually coming out of the handle. That being the case, you would do just as well to buy a blank rod and wrap it with tape that will not come off (unless intentionally removed).

Ferrocerium rods have very few problems. However, if you don’t use the rod for some time, it may oxidize. You can remove this with the back of your knife, or you can add a light coat of spray paint on the rod and scrape this off during the next use. If uneven pressure is applied through repeated attempts at striking, you may also develop ripples on the rod itself. You’ll need to remove these to make the rod function properly, as they will act like speed bumps during striking. To remove these, you need to use excess pressure to remove the extra material and make a flat striking surface again. If you properly strike the rod, it should take no more than three attempts to ignite tinder. If this does not happen, there is an issue with the tinder and

you'll have to figure out what it is. The rod is a resource that should be conserved.

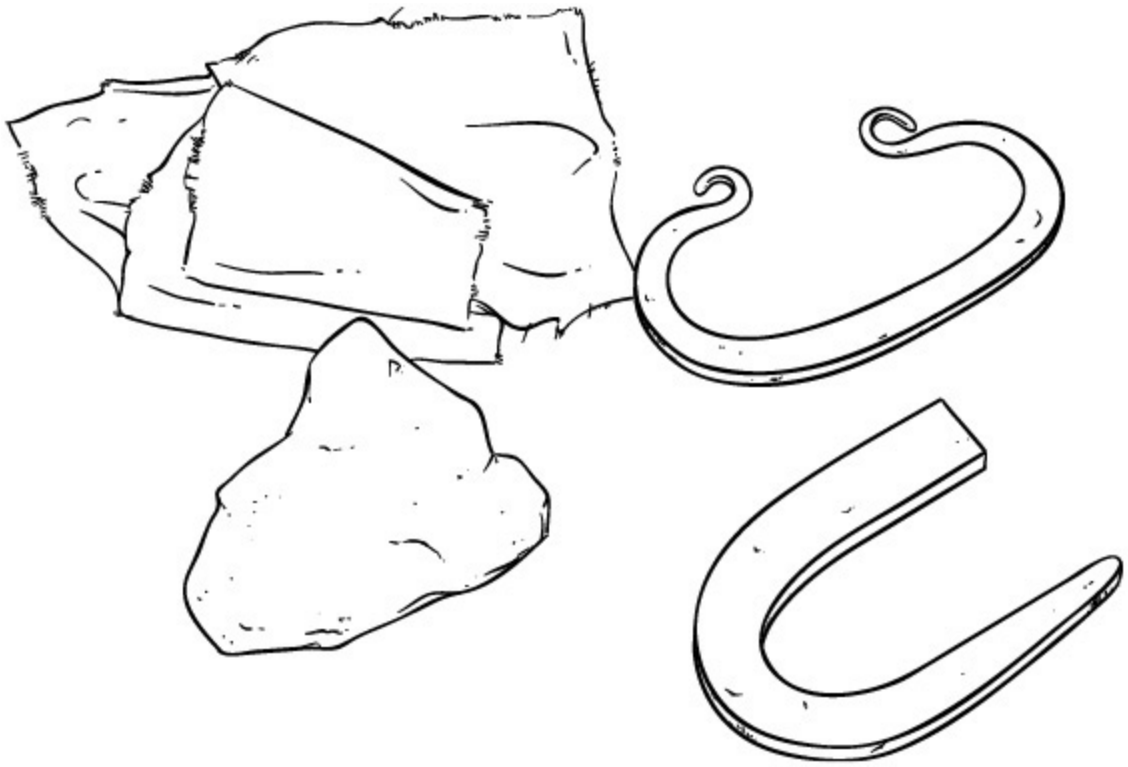
MAGNIFICATION LENS (SUN GLASS)

From the point of view of resource management for your kit, the **magnifying glass** or "sun lens" is really the best fire-starting method. If the sun is shining, you need only natural materials to make an ember. If you have made charred material, this will be easily ignited in seconds by the sun. Any lens carried should be at least 5x magnifications; size is actually more critical than power of magnification. The larger the surface area to collect the sun's rays, the better it will work. You do not need to go overboard in this aspect, however; a simple lens that is 1½–2" in diameter will work fine. There are containers for tinder with built-in glasses, called Hudson Bay Tobacco Boxes, which were designed to carry tobacco and then ignite the pipe. These work well for holding charred material and other fire-starting implements in a nice self-contained kit. The large lens from a broken pair of old binoculars or a Fresnel lens from any drug store will also work well.

KNIFE/AXE BLADES

You can also use the blade of your knife as an old-style flint and steel set to effect ignition, if the blade is of high-carbon steel and a good Rockwell scale hardness. This method will require the use of a rock such as flint, chert, or quartz that has a hardness rating of 7 or above. The rock is used to strike or drive material from the back of your blade. With this method, you are removing iron particles from the blade spine. These particles are pyrophoric, as with the ferrocerium rod, although these sparks will only be

about 800°F. Unless a tinder-type fungus is used, this method will require a charred material for ignition of the ember. You can then use this ember to combust a tinder bundle or bird’s nest.



Flint and steel set

FRICTION FIRE (STICKS)

In this section, I will explain the basics of primitive ignition. There are many factors that can make a huge difference in ignition or failure, and most books make it sound much easier than it is. To start, understand that any fire requires heat, fuel, and oxygen to burn. You are aiming to create a coal; you will then transfer this coal to a nest and blow it into a flame. Creating a coal with this method requires a smoldering ember; this means limiting the flow of oxygen within the ember itself. The dust from the friction created between the two sticks is compacted into a small spot with

little surface area to promote oxygen flow. Humidity and moisture of the materials are the biggest factors preventing ignition, so depending on the environment, these elements can greatly increase or decrease your success.

The other major factor for creating fire is your materials. You need materials that are fairly soft; they will be used as a board and spindle, so that downward pressure removes small particles of wood easily.

The preferred method for primitive fire-starting in the eastern woodlands is a **bow drill**. You need four pieces to make a bow drill. The handhold or bearing block is the piece that is the most difficult to manufacture in nature, since this portion of the set is where you want the least amount of friction to occur. This means that the handhold should be of a harder, denser wood than the spindle and hearth board. Any friction within the handhold will reduce the friction achieved on the hearth board, and make operating the set much more difficult and less energy efficient. The spindle portion becomes the “drill bit” that is meant to remove materials from the board to create the dust; the dust is ignited by heat caused by friction and speed. The spindle and the board should generally be made of the same materials. A good rule of thumb is that the material chosen should be made of wood in which your nail can make an impression.

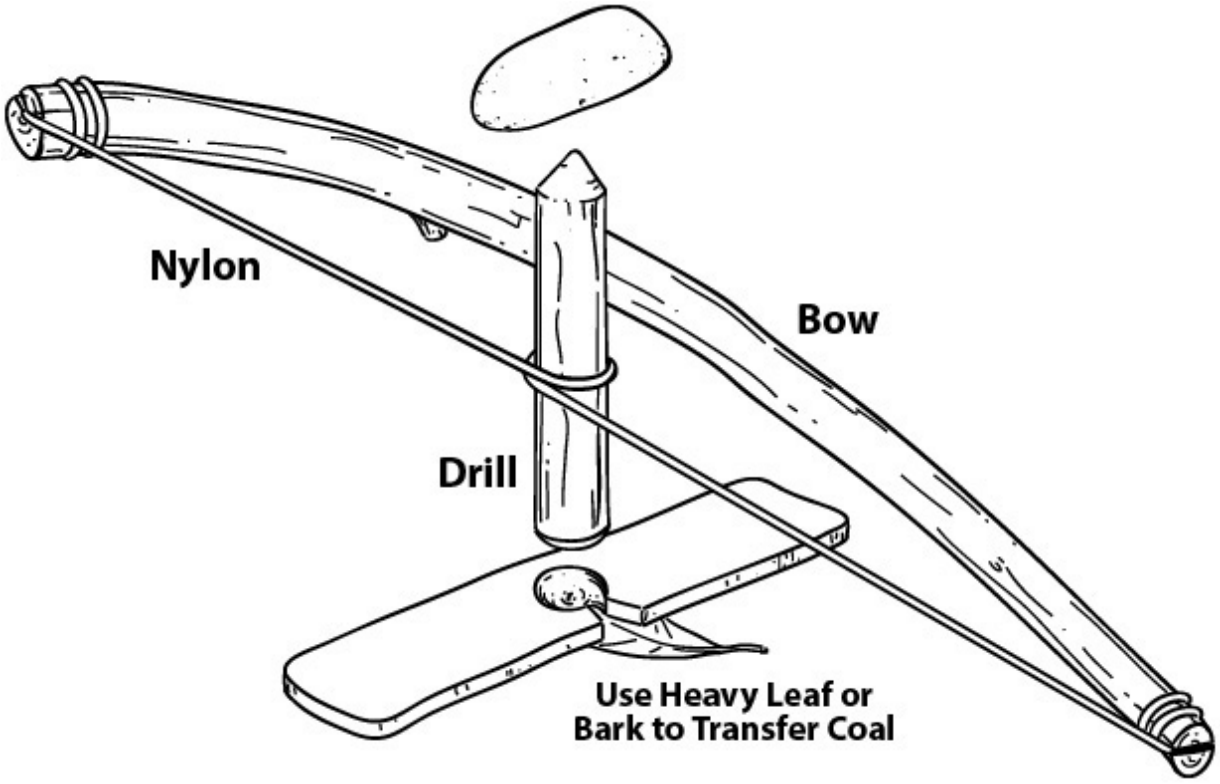
Again, moisture content is the most critical in the two pieces of the set. The fire board or hearth is the bottom piece of the set that will be “drilled into,” where the spindle will create the mound of minute shavings or dust to be ignited. Make the bow from any strong stick; if this stick has a gentle bend, that will help in the long run. It can be green or dead, as long as it is strong enough to hold a tight line or bow string, and is about 3' long.

Once your components are gathered, follow these general rules:

- The spindle should be approximately the diameter of your thumb, and the length from your thumb tip to your pinky finger tip with the hand

outstretched, or about 9".

- The hearth board will need to be two-and-a-half times wider than the spindle, and about ½" in thickness.
- Form will be the other key element to your success with this method; you should always lock the wrist of the bearing block hand into your shin, and make sure the spindle is perpendicular to the board.



Bow drill fire kit

When starting to move your spindle on the board (to attempt to make a coal), do not rotate the spindle vigorously at first. Apply steady downward pressure, using the entire length of the bow string to achieve maximum revolutions for each stroke. As the dust begins to collect in your notch, you can then slightly increase your speed. This will cause friction heat that will ignite the collected dust into a smoldering coal. The biggest mistake most

students make is going too fast right out of the gate. If you do this, you'll create heat but no material for ignition.

CHARRING TINS

Charring tins are an essential part of every woodsman's kit. A tin of some sort similar to ones used for Altoids mints or shoe polish works fine. You'll use this tin to create charred material to assist in the fire-making process, especially when bird's nests or conditions are damp. By quick ignition of charred materials, you will have a guaranteed ember to provide needed heat for ignition of a bird's nest. To use this tin, place some natural material such as cotton, punky woods, or the soft inner pith of plants inside. Close the lid and place the tin on the coal bed of your fire. By superheating the materials inside—but not allowing oxygen inside—you will create a carbonized charred material like charcoal. It is important to let the tin cool down before opening it, as the addition of oxygen to hot materials will cause combustion to occur. For a few swatches of cotton material about 2" × 2", it will take about ten minutes in a normal tin to create the char.

BUSHCRAFT TIP

To test your char, you can use any of the ignition sources you have. (This is the advantage of creating this material—a single spark should immediately create a glowing ember if done correctly.) Solar ignition with proper char should take less than 5 seconds of direct light with a sun glass. This is your safety net, in case you have not collected the proper materials for a bird's nest or tinder bundle along the trail or during the previous day, and must work with marginal materials.

TIPS AND TRICKS FOR SAFE, SUCCESSFUL FIRES

If you can find a tubular lamp wick, this can be used to cover your ferro rod to prevent oxidization when not in use. It also can be used to create an ember: Char one end by lighting it on fire, and then smother it out. This can be used with your ferro rod or sun glass to create an ember.

When it comes to fire, remember to practice the primitive methods, but always prepare by having your modern backups in case of emergency. Practicing with more primitive methods will give you a much better understanding of what it takes to manipulate the triangle of fire to get what you want.

A BIC lighter is a good gauge of ambient temperature. If you lay it outside on a blanket in camp and it will not light, the temperature is below freezing. If the temperature is above freezing, the BIC should light easily, provided it is in good working order to begin with.

Solar ignition is always easiest during the zenith hours of the sun, from 10 A.M. to 2 P.M., and will always be easier in summer than in winter.

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PART 2
In the Bush

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Chapter 7
SETTING UP CAMP

> *"Shelter provides a micro-environment that supplements inadequate clothing or allows you to shed cumbersome layers, especially when you want to stop moving or when you want to sleep in cold weather. Shelter also enhances the effect of a warming fire."*
>
> —MORS KOCHANSKI, 1987

One of the most important decisions you can make while tramping is where you choose to establish your camp. Much of this decision is based on a simple set of rules (the Four Ws), but some other things to consider are:

- How long do you intend to stay?
- Are you only stopping for a quick lunch and a break?
- Are you staying only one night then moving on, or do you intend to make a base camp from which to work for several days?

Any camp you choose as a base camp for an extended period will need to be thought out more carefully, because of the eventual depletion of close resources.

THE FOUR WS

The Four Ws are a very easy yet important checklist of concerns to follow when choosing a proper camp location. They are:

Wood
Water
Wind
Widowmakers

WOOD AND WATER

The first W stands for **wood**. Be sure to ask yourself the following questions each time you stop to camp:

- Do I have a close source for the wood I need to accomplish any tasks I plan for this camp setting?
- Is there firewood to last the time I will be here?
- Is there enough deadfall, or will I need to cut wood? (Depending on what tools you have with you, this can be significant.)
- Are there construction materials close by that I can use to build shelter framing, cooking gear, or any other crafting I have planned?
- Is the wood that is available to me the proper species for either a warming fire or a cooking fire?

Generally, to build a quick-warming fire as well as for initial fire lays, you want softer species of wood, such as willow, poplar, pines, or cedars. If you are planning to cook and need a lasting coal bed without the resins and oils prevalent in some of these woods, you will want hardwood species such as ash, walnut, oak, and hickory.

The second W stands for **water**. As with wood, there are important questions to answer before you set up camp:

- Is there a water source within short distance of camp that will be convenient for easy collection?
- Is the water source a flowing source or standing source? A standing source will evaporate in summer and poses the threat of stagnation as well. Any ground-source water will need to be boiled at a minimum, but both filtering and boiling is preferred when possible.
- Is the water source large enough to hold food fish?
- Is the water attractive to other animals that will use it, such as frogs, crayfish, turtles, and the like? Is the source large enough to attract mammals to use it as a daily source of water?

These questions can help when you're making decisions about where to set up a base camp.

WIND AND WIDOWMAKERS

The third W is **wind**. Wherever you choose to camp, wind is a concern both for the threat of fires running out of control and for the ability to combat or take advantage of convective breezes. You also want to consider wind when pitching or flying a tarp, as the wind can blow smoke from your fire into your face or shelter through the night (which becomes a huge nuisance impeding your enjoyment of the camp). The elevation of your camp will affect the amount of wind to which you're exposed. Camping on a ridge will make you more susceptible to wind, but camping in low areas makes you more prone to cold temperatures. Remember that warm air rises and colder air sinks; for this reason, you should choose middle-high ground if feasible.

The fourth W stands for **widowmakers**. These are standing dead trees that may easily fall or break if subjected to wind. They could cause serious

safety issues if they are close enough to fall into your camp area or the area into which you will frequently travel to get wood or water.

CAMP HYGIENE

Once you have chosen a camp location, you will need to think about hygiene needs in the form of waste disposal if you are camping for longer than one night. Urine as well as defecation should be kept far away from water sources. Both need to be kept away from camp so as not to invite bacteria and critters. Urine is a simple issue; you can just walk twenty steps or so in the opposite direction of camp and the water source and do the business straight on the ground or against a tree. Doing the other business, however, can require a bit more work if the stay will be longer term. If you are only there for a short period, you can simply dig a hole about 8–10" deep when the need arises and fill in the hole when finished, allowing everything to decompose naturally. If you are staying longer, a small, elongated trench may be in order. Dig this trench a bit deeper. With each visit, cover the deposit; with subsequent visits, you will move down the trench a bit at a time. Any group including more than one person camping for a few days will require a more elaborate system such as several trenches in different areas.

PERSONAL HYGIENE

For personal daily hygiene, I usually use the bandanna in my pack combined with ashes from the fire to create a quick solution that is antibacterial in nature when a bit of hot water is added. To make this solution, add white ash from hardwoods to water, in a ratio of three parts water to one part ash. I have washed my clothing in this same solution, and it will do a pretty good job when you’re out of soap. This will do for

washing, if needed, but simple fire smoke is antibacterial in nature for the very short term; standing over the fire and opening your clothing to let smoke in will kill many odors from perspiration.

Clean Teeth

I generally carry a toothbrush because, in my experience, it is far superior to any plant material or chewed stick for the job. (Plus, the thought of a splinter in the gums is enough to make the toothbrush more than worth the weight!) When brushing teeth in the short term, warm water will do a fine enough job; if grit is needed, mix ashes with water for this as well.

Clean and Dry Feet

One of the most neglected yet important matters that you must address daily is your feet. *If you cannot walk, you cannot tramp*. Many things affect your feet, and they need special attention so that you can maintain comfort while tramping. Boots for tramping should be well broken in, of course, and fit the needs of the environment in which you are operating. Summer boots should breathe well, and winter boots should be well insulated. Beyond this, pay attention to the socks on your feet, and always carry changes with you. Wet feet, no matter what the climate, are never comfortable for long. Socks should be changed often when hiking; expect to go through at least three pairs per day on longer treks. If you must sleep in socks, never sleep in the ones you wore all day; I do not recommend sleeping in socks in any case, unless you carry a special loose-fitting pair. Tight socks will restrict circulation and result in cold feet at night, even in a good bag. Feet should be well dried in the air or by the fire every night before turning in, and a bit of a smoke bath won’t hurt either if you cannot wash them.

TARPS AND TARP SETUP

The cover element you use will dictate how you adapt to a given situation. This is the reason why I believe so strongly in tarps and tarp tents. Even if you are using a hammock, versatility is key to a comfortable night's sleep in any given scenario. It is important that you choose or make tarps that have the maximum amounts of points for tie outs, be it by loops or by actual tie-out tails. There should also be loops for pulling the tarp from the outside to increase the inside space.

The following instructions explain some of the most common tarp configurations. Before we begin, here's the basic vocabulary used for tarp and tarp tent pitches:

- When a tarp is set up without any of the fabric touching the ground, it is known as **flying the tarp**. This works very well for hammock-type setups.
- If any portion of the tarp's fabric is staked at ground level, you are **pitching the tarp**.
- To **pitch a camp** is to set it up, and to **strike a camp** is to take it down.

FLYING A TARP

Most often, when flying a tarp, you will use a ridgeline of some sort as a main support for the tarp. The tarp can be laid across this ridgeline either in square or diamond fashion when using a square tarp, which I highly recommend for the most versatility. The ridgelines I use are generally either a natural material rope of ½" diameter or a piece of 550 parachute cord 25' long. This length will give you plenty of room, in case the trees are farther apart than desired. Follow these instructions for a foolproof setup:

Tie a bowline knot at one end of your ridgeline rope or cord. Tie an overhand knot with a 2" tail, to be used as a stop knot, on the other end.

Pass the rope around a tree or main tie-out location, and then feed the tag end through the bowline. This will create a self-tightening loop that will not lock (for ease of adjustment) but will remain secure under load.

Once the other end of the rope has been passed around an opposing tree, create a trucker’s hitch, leaving a loop that stops on the stop knot. This allows you to secure one corner of the tarp by passing this loop through a tie out on the tarp, and then placing a simple toggle in the rope loop, drawing it down to tighten the tarp. This will come out easily, if needed, for striking camp or making adjustments later.

The best thing to use on the opposite end of the tarp is a simple prusik knot made from a 6" loop of line. After tying the line to the ridge, pull the loop through the opposite tie-out loop and toggle it. You can then slip this along the line until the tarp is tight to the ridge and it will hold by friction, making adjustments and striking easy.

At this point, stretch the tarp to the desired height on the two or four corners, and either guy it out with lines to another object or stake the lines to the ground. It is important to be sure that these lines are easily adjusted as well, because many tarp materials will stretch, depending on weather. Adjustable lines make tightening easy.

THE LEAN-TO

You can build a simple lean-to with either a rectangular or square tarp by attaching two opposing corners to a ridgeline, as described earlier, and staking the other side of the tarp to the ground with stakes. The most

important thing to understand here is that the pitch or angle of the tarp controls important factors, such as how much heat will be held in and whether rain easily enters from the front.

DIAMOND OR PLOW POINT SHELTER

One of my favorite and quickest tarp shelters to set up is the **diamond shelter**. Again, this is best made with a square tarp. Attach one corner of the tarp to a standing object such as a tree or to one end of the ridgeline only. Stake the remaining three corners to the ground, creating a diamond-shaped shelter. This type of shelter has many advantages, especially when used with the ridgeline, as it can be quickly adjusted to create a lean-to during fair weather. It is great for completing camp tasks under cover from the sun and gives three-sided cover at night or during inclement weather. If your tarp has outside loops, you can guy a centerline loop out to another object to create more room on the inside, or you can use a stick on the inside to accomplish this.

TARP TENTS

Tarp tents are usually square tarps with extensions to the front that become doors when a center pole is used or when the tarp is secured to a ridgeline by the center tie-out point. This creates a three-sided structure with two flaps used as doors to create a full enclosure. You can fashion a tarp tent from a large rectangle tarp as well, but you will have to carry a larger-than-normal tarp to get the same effect as a manufactured tarp tent. The biggest advantage to tarp tents is their versatility. They can be used for all configurations of a normal tarp, with the advantages of a tent if needed.

GROUND CLOTHS

A **ground cloth** of some kind will come in handy not only as a moisture barrier but also as a convenient place to set yourself or your gear off the direct ground. You can fashion it from any scrap material that is waterproof (if possible), but it does not need to be any larger than the length and width of your body so as to keep your kit light. A ground cloth large enough to be folded over can be incorporated into a bedroll configuration. In fair weather tramps, you can forgo a tarp altogether.

FIRECRAFT

Fire-making is the most important skill for any woodsman to master. With fire, you can warm yourself, dry your clothing, and make your water potable. These are the simplest of things you may need from your fire on a daily basis around camp, but its usefulness goes further than any individual piece of kit. You'll need fire to cook your food, to create needed ash, to char materials for future fires, and to keep away the boogieman in the middle of the night. By the fire, you will spin the yarns of your adventures and dream of future ones. The campfire is the television of the woods, ever changing and surfing the channels as it burns through the night.

THE TRIANGLES OF FIRE

All fires need three components to burn: **ignition** (or heat), **oxygen**, and **fuel**. By understanding and controlling these inputs, you can master fire. If you add to or limit any of these inputs, you will change the outcome. This means you can create a warming fire, create a cooking fire, or make charred material for creation of your next fire.

Fuel is further divided into a second triangle: **tinder**, **kindling**, and **fuel**. These are major inputs that will either increase or diminish your chances for

success, especially when conditions are less than optimal for building a fire to begin with.

- *Tinder* is the most highly combustible material within the fire's components. It can be made up of many things from natural to man-made materials, but should readily take a spark or easily catch fire when a smoldering ember is added.
- *Kindling* is made of natural materials that are pencil size or smaller in diameter. You will want about two-thirds of your initial fire lay to be made up of this material.
- *Fuels* will be anything bigger than kindling, up to and including logs, depending on the nature and need of the fire you are using.

STARTING MATERIALS

In Chapter 6 we discussed the major components of your fire kit:

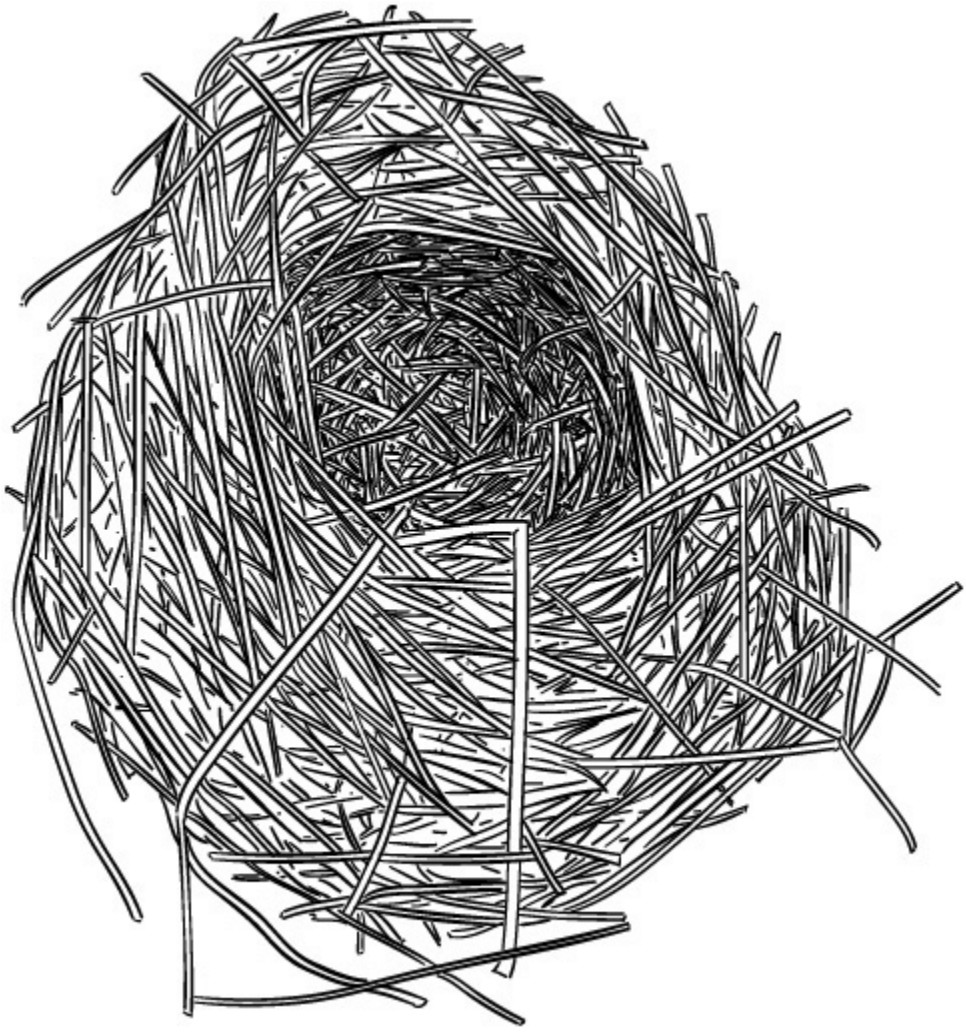
- Lighters
- Ferrocerium rods
- Magnifying glass (sun glass)
- Char tin

Together, these materials provide the means to start fire. Now you need your starting material: tinder.

BIRD'S NESTS

A **bird's nest**, as an element of the fire lay, is a bundle of highly combustible material shaped and formed to mimic the nest of a bird. What is imperative to understand is that it truly needs to be like a bird's nest: a combination of fine, medium, and coarse materials that are highly

combustible, such as inner and outer barks from softwood trees such as cottonwoods and poplars. Grasses and weeds will work for this, as well as birch barks, but some barks have other properties that will be discussed later. A bird’s nest is used in combination with an ember, either created from char or from another method such as a bow drill. It must be of a size that will sustain flame long enough to light kindling. A good rule of thumb for tinder is to make sure it is softball size or larger.



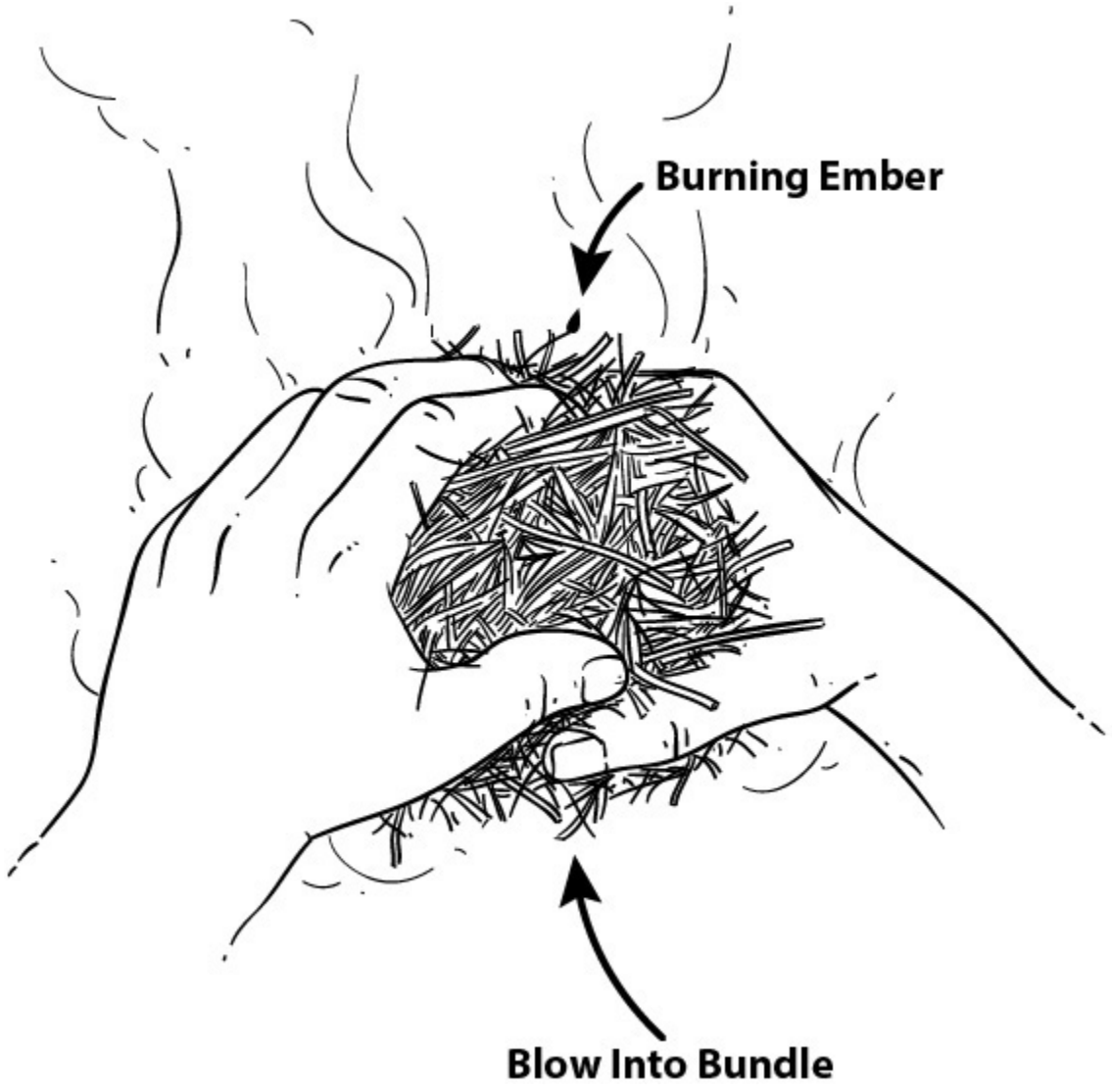
Bird’s nest

IGNITING THE BIRD’S NEST

The bird’s nest is best used when materials are slightly green or damp, and it may take the ember some extended time to effect ignition. When using this method, keep the nest separate from the actual fire lay and place the ember inside the bird’s nest where the egg would be. Raise the nest just above your mouth level, remembering that heat rises. Blow lightly on the ember to heat the surrounding materials. As the ember and material glow brighter, you can increase airflow until the nest flames, then rotate it 180° to make the flames rise through the materials. Then, place this burning bundle into the fire lay itself.

TINDER BUNDLES, TWIG BUNDLES, FLASH TINDERS, AND PINE RESINS

Tinder bundles differ from a bird’s nest in that they are placed at the base of the fire lay and generally ignited without the use of an ember. For this method to succeed, the tinder must be dry and combustible enough to readily take a spark from your ferrocerium rod. This bundle is similar in materials, size, and nature to the bird’s nest, except that there is no need for prolonged heat from an ember. You can combine tinder bundles and bird’s nests with a twig bundle to prolong the time needed to make a fire sustainable, which gives you more time to find materials to add to it.

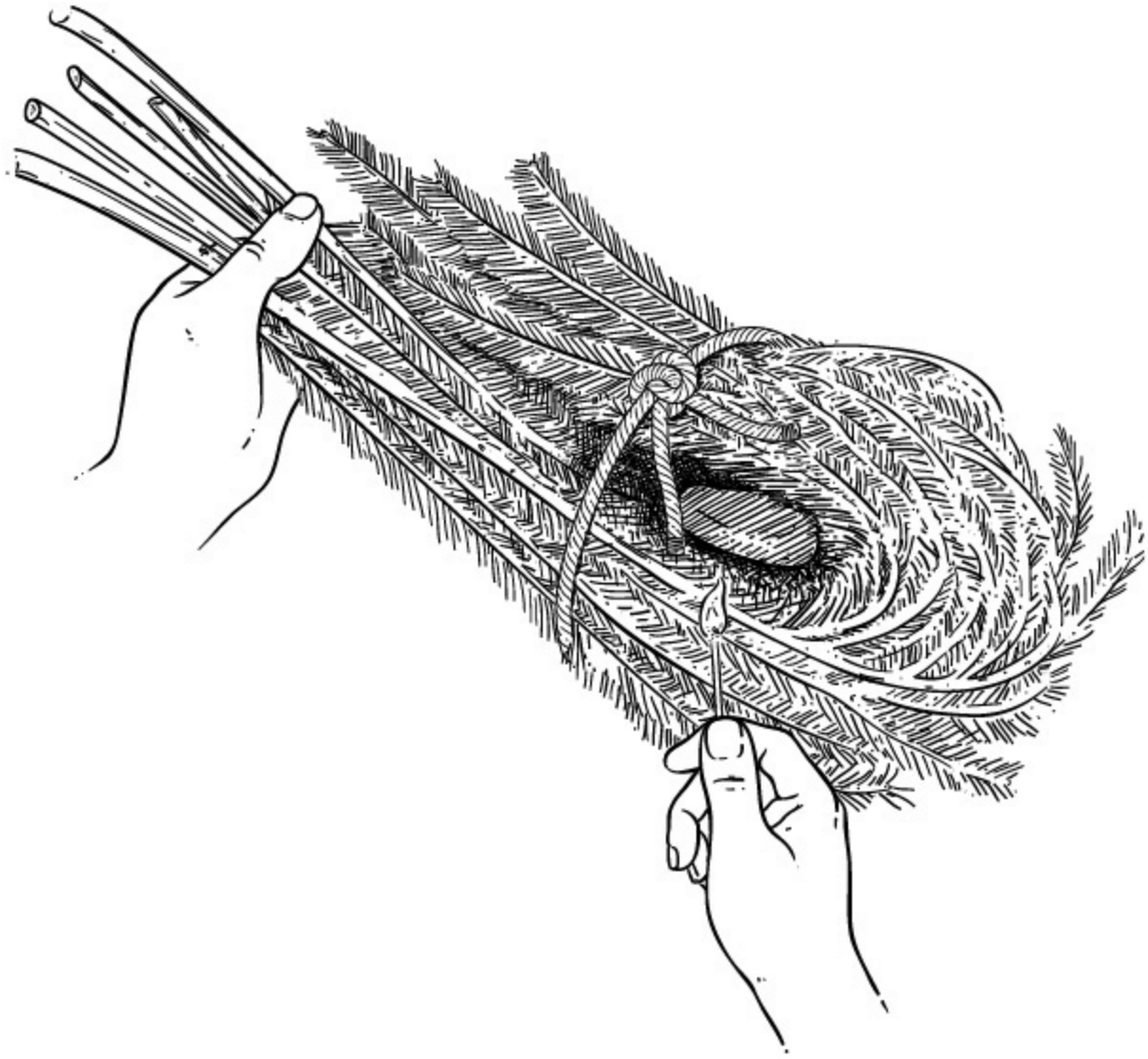


Tinder bundle

Twig Bundles

A **twig bundle** can be used alone or combined with bird's nests or tinder bundles. The most effective way to ignite this tinder is to apply an open flame from a lighter. This will allow you to somewhat forgo the tinder leg of the triangle by applying excessive heat to combustible materials, such as dry weed stems and weed tops. Wrap a twig bundle under a nest or tinder bundle, and then turn the flame over onto itself. Allow the flame and heat to

rise through the twig bundle; this is the most effective method, if used without open flame. Then insert this burning bundle into the fire lay.



Pine twig bundle with tinder

Flash Tinders

Some plant materials are what we call "**flash tinder**." They contain volatile oils that will readily combust, but because of the fine fibers involved, they will burn very quickly and the flame is short lasting. When these are combined into a bird's nest, they can be very effective. They can

also be used in tinder bundles for the same purpose. The best examples of flash tinders are thistledowns and cattail fluff.

BUSHCRAFT TIP

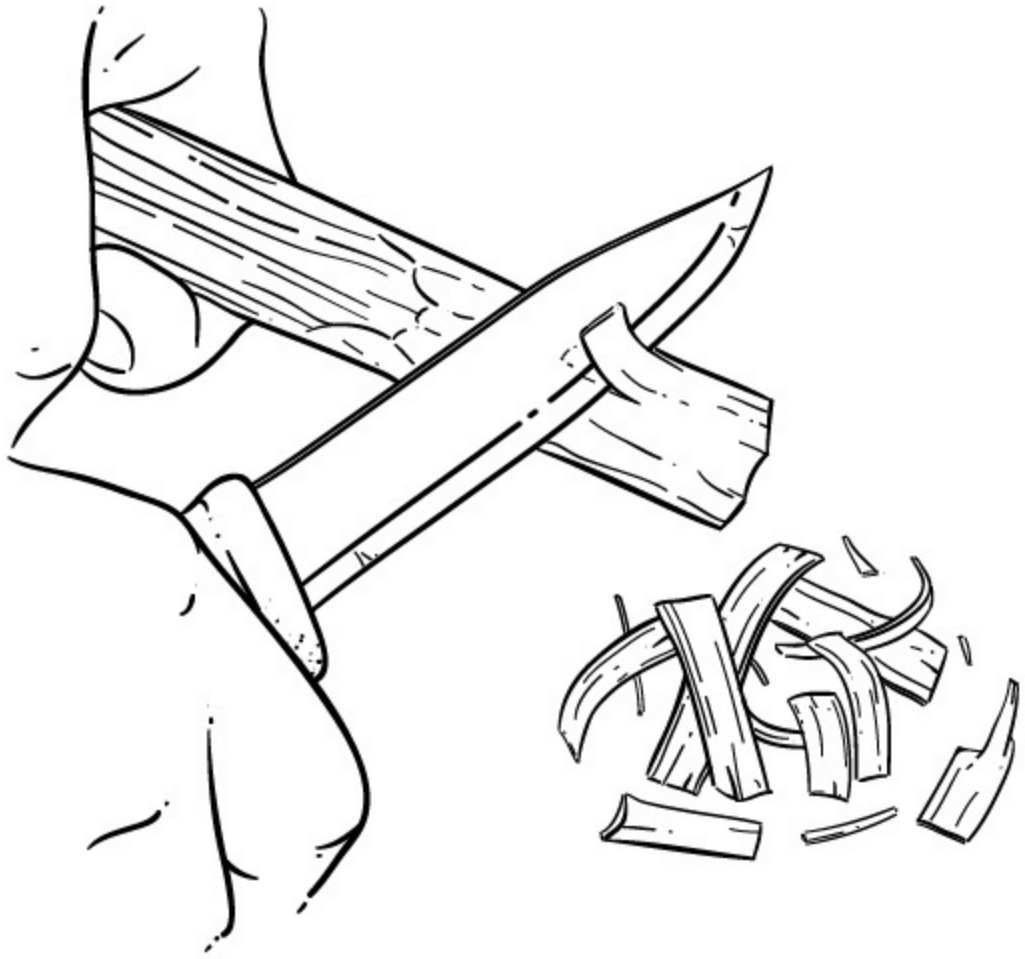
Many trees have natural oils and **resins** that act as accelerants. These can be very useful, as barks and wood will have a much longer burn time than plant fibers. The two most significant sources for your purpose are birch barks and pine resins. Both of these require different types of processing. Birch bark can be peeled from the tree, but its intended use will decide the type of processing. Remember that any time you are attempting ignition by sparks from a rod, you will need lots of surface area to catch the sparks. The same holds true with barks such as birch; you'll need to shred it as finely as possible to expose many surfaces that can be ignited by sparks. If you have an open flame, the bark will readily burn straight off the tree.

Pine Resins

Pine resins can be used in a lot of ways; the dripping sap from a wounded pine is highly flammable, and you can simply spread it onto dry material and ignite it with a rod or flame. These resins will also settle in the tree itself, creating what is called **fatwood**, **pitch wood**, or **lighter pine**. Most pine trees have resin-soaked areas of the wood at any place there is a joint —for instance, where a branch comes out from the tree. On a dead pine, the resins will run to the bottom toward the roots. Standing dead pines are the best for this wood, but a fallen dead pine can hold good resources as well.

This wood will smell of turpentine and is very combustible with open flame. However, you can further process it to make it even more usable for a fire kit:

- Scrape this resin-laden wood with the spine of your knife, creating a pile of fine shavings. The shavings will combust quickly with the hot sparks from your ferrocerium rod.
- Create feather sticks.



Cutting shavings from fatwood

FEATHER STICKS

Making feather sticks is a fantastic way to increase your kindling. If small dry sticks are not available, soft woods make the best feather sticks.

Shave a series of small curls of thin wood on a larger piece of stick. If this wood is fatwood pine, you'll have an accelerant to make this kindling even more powerful. By creating feather sticks, you're increasing surface area and allowing flames to heat the material faster, making it burn faster. A good feather stick will have several of these fine shavings on the same plane, and each will have several curls. Feather sticks can make up the entirety of a tinder pile used for a fire lay, if need be.

Feather stick

FIRE LAYS

The type of **fire lay** you set up is determined by your needs. Here we will discuss a few basic lays. Beyond the size of your tinder bundle and the amount of kindling needed to create a good sustainable fire, the two rules to remember are:

> More oxygen is generally better. This does not mean that you should blow or fan your fire from the time you ignite it until it is sustainable; rather, it means that you must have a lot of space between the kindling so that oxygen can flow into the fire.
> Fire loves chaos. This means that you do not need to stack things in neat piles to make a good fire lay. Picture the old childhood game of pick-up sticks—that is what chaos looks like in your kindling.

Another major rule to remember when starting a fire is that no fuel should be added to any fire until flames have risen above the current fuel level. This will keep you from depriving the fire lay of precious oxygen.

BUSHCRAFT TIP

Most people I see who fail at fire building during classes at my school do so because the fuel they are using is too big for the current heat coming from the fire. Remember that the smaller in diameter the fuel, the faster it will burn. Add kindling until you can see a visible bed of coals, and then begin to add fuel.

TEEPEE FIRES

The **teepee fire** lay is the one that I use the majority of the time to start my initial fire. It is very useful because of the updraft created, which allows oxygen to enter from the bottom and heat to rise to the top quickly. The best

fires take advantage of the **Venturi effect** (updraft). Place many sticks in a stack fashioned like a teepee, their tips touching at the top, with a tinder bundle or bird's nest inside the teepee so that the heat rises into the sticks and the flames heat along the vertical length of the materials.

Teepee fire lay

LOG CABIN FIRES

The **log cabin fire** lay is best used in optimal conditions with very dry wood. It is reminiscent of playing with Lincoln Logs: You create a square box of fuel with a pile of kindling and tinder inside. Lay the larger pieces across one another; the space between them gives oxygen a chance to flow into the lay. The tinder and kindling are usually lit by open flame in this type of fire lay.

LONG FIRES

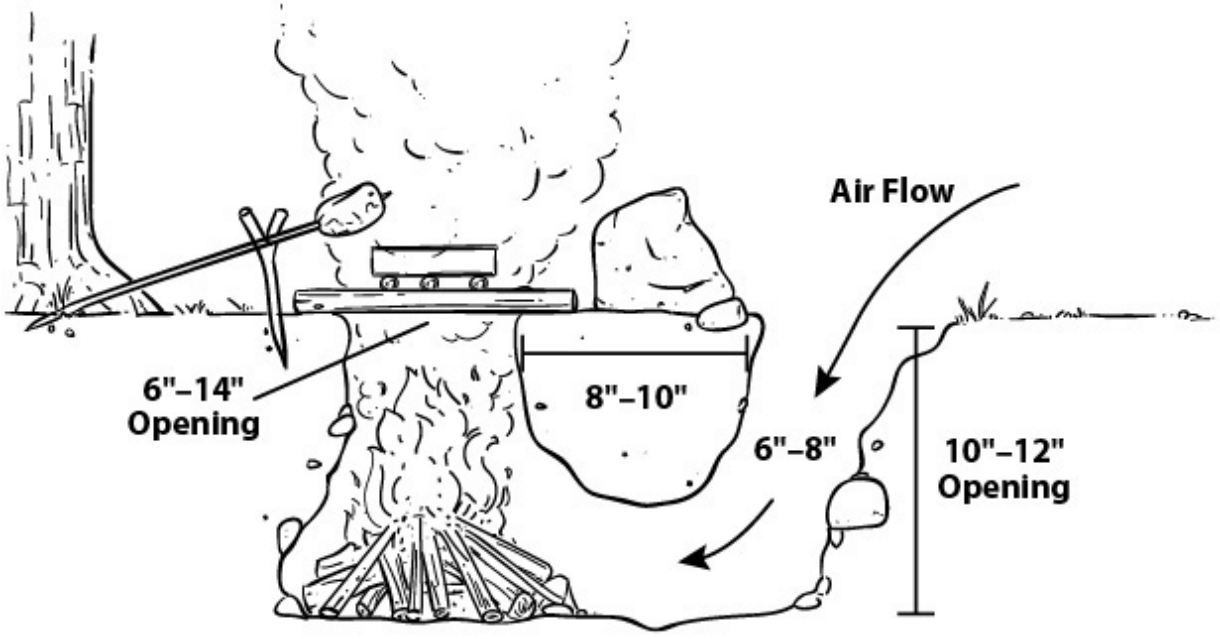
When shelter is not optimal and the weather is very cold, a **long fire** can be a lifesaver for a comfortable night’s sleep. A long fire is just what it sounds like—a fire that’s built in a long line, parallel to your body when you’re asleep. To build a long fire, you will need some large deadwood or dry standing dead wood that you can cut down. Long fires should be as long as you are tall and placed approximately one full step from the area in which you intend to sleep. It is usually prudent to build a wall of logs behind the fire, which will absorb heat and become a thermal mass heater. These are often called reflectors, although without a reflective surface, they really only hold heat and push it by convection back toward your camp. These back walls should be as high as the top of your shelter, and the fire should be placed in such a way as to obtain a cross breeze to help feed it oxygen. For a long night in cold weather without proper shelter, maintaining a long fire will take enough wood to fill a regular-size pickup truck as high as the cab. Picturing this alone tells you the work involved and calories that will be spent just gathering this much wood. If such a fire is necessary, you should begin setting up at least four hours before sunset.

DAKOTA FIRE PITS

If you really want to take advantage of updraft to accomplish a hot burning fire, build a **Dakota fire pit**. These work very well if the materials to be burned are green or damp, or if you need excess heat for a project such as pit forging.

Dig two holes approximately 2' apart, about 14" in diameter, and 6–12" deep. These holes are then connected by digging a tunnel between the two. In one hole away from the downwind, build the fire lay. In the opposing

upwind hole, dig an angle on the edge facing the wind. That will maximize airflow into the tunnel.



Dakota fire hole

This type of fire has advantages and disadvantages. It will burn very hot, so if you're burning substandard material, this method will utilize the material most effectively. However, fuel consumption will also be at a maximum, so if resources are short, this is not a good setup.

KEYHOLE FIRES

This type of fire is the best for cooking. To set up a **keyhole fire** pit, dig a small hole for your fire (how deep will depend on the size of the fire you want). At the front of this hole you will dig a trench at the same depth as the fire hole, so you can drag coals from the heart of the fire to create a cooking area over the trench. The resulting fire pit resembles the shape of a keyhole.

This works particularly well if you are using a pan to cook with or if you are roasting your food.

TIPS AND TRICKS FOR YOUR CAMP

If your shelter location does not have good drainage because of the environment and you cannot get yourself off the ground, you can trench around your shelter to guide water runoff.

Old files are generally tempered very hard and will make passable fire steel for flint and steel ignition, if you grind off the edges. When doing this, be sure to take it slow and dip the file in cool water to preserve its temper.

After your fire has been kindled and you are working to make it sustainable, never add fuel until the flames are above the current level of fuel.

Always use green sticks and wood when building tools such as rotisseries for cooking. Never use resinous wood such as pine; instead, use hardwoods such as hickory or ash.

Coating ironwork such as firesteels with beeswax when hot will help preserve them and prevent rust.

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Chapter 8
NAVIGATING TERRAIN

"Knowing where you are is unnecessary. What you need to know is how to get back to where you were."

—DON PAUL, 1991

Navigation is an underrated skill for any woodsman. Even finding your way back to camp from a short scout should always be managed with some verification method in case you get turned around. Not only is it important to understand all aspects of map and compass, but you must also develop a sense of direction and travel by paying close attention to where you have been and where you are going. Learning terrain feature association and using hand rails will assist you greatly when traveling short distances, but for making long treks the map and compass are the keys to success.

COMPASSES

Not all compasses are created equal, and there are many types on the market today. I have always made sure that every piece of equipment I carry is both optimal for its intended use and multifunctional. The compass is no different. Your compass should act as a:

- Navigational device
- Signaling device for emergencies

- Mirror used for first aid as well as daily hygiene
- Tool capable of fire-starting by solar ignition

With these functions in mind, you can begin to picture the type of compass you should choose. You want a **baseplate compass** made for map reading. This compass has a flat plate, usually made from plastic, that can be laid on the map and is transparent for use in conjunction with mapping and factoring routes on a map with your compass. It also has a movable **bezel ring** that rotates on the compass, on which the degree readings are marked, preferably with glow-in-the-dark paint. This will make it easy to dial in a travel bearing both from the map and by using the visual bearing method discussed in this chapter. Make sure the compass has a mirror as well as a magnifying glass of 5x. When it comes to your compass, I recommend spending the money to buy a good one; that way, you will trust it when it's needed. If you want, you can carry a backup compass, but it will never replace a true baseplate compass made for map reading and navigation.

WHY CARRY A COMPASS?

The answer to this is not as obvious as it sounds. General direction-finding does not require a compass; in fact, on sunny days, you are your own shadow stick! In the Northern Hemisphere, if you are facing the sun you are looking in a southerly direction: southeast (SE) in the morning, southwest (SW) in the evening, and generally south (S) during the zenith hours from 10 A.M. to 2 P.M.

BUSHCRAFT TIP

If there is no sun, the trees will tell you the answer. All trees have one thing in common: They all have to effect photosynthesis to live, so the most branches will be on the side of the tree facing in a southern direction. Look at several trees to verify your conclusions.

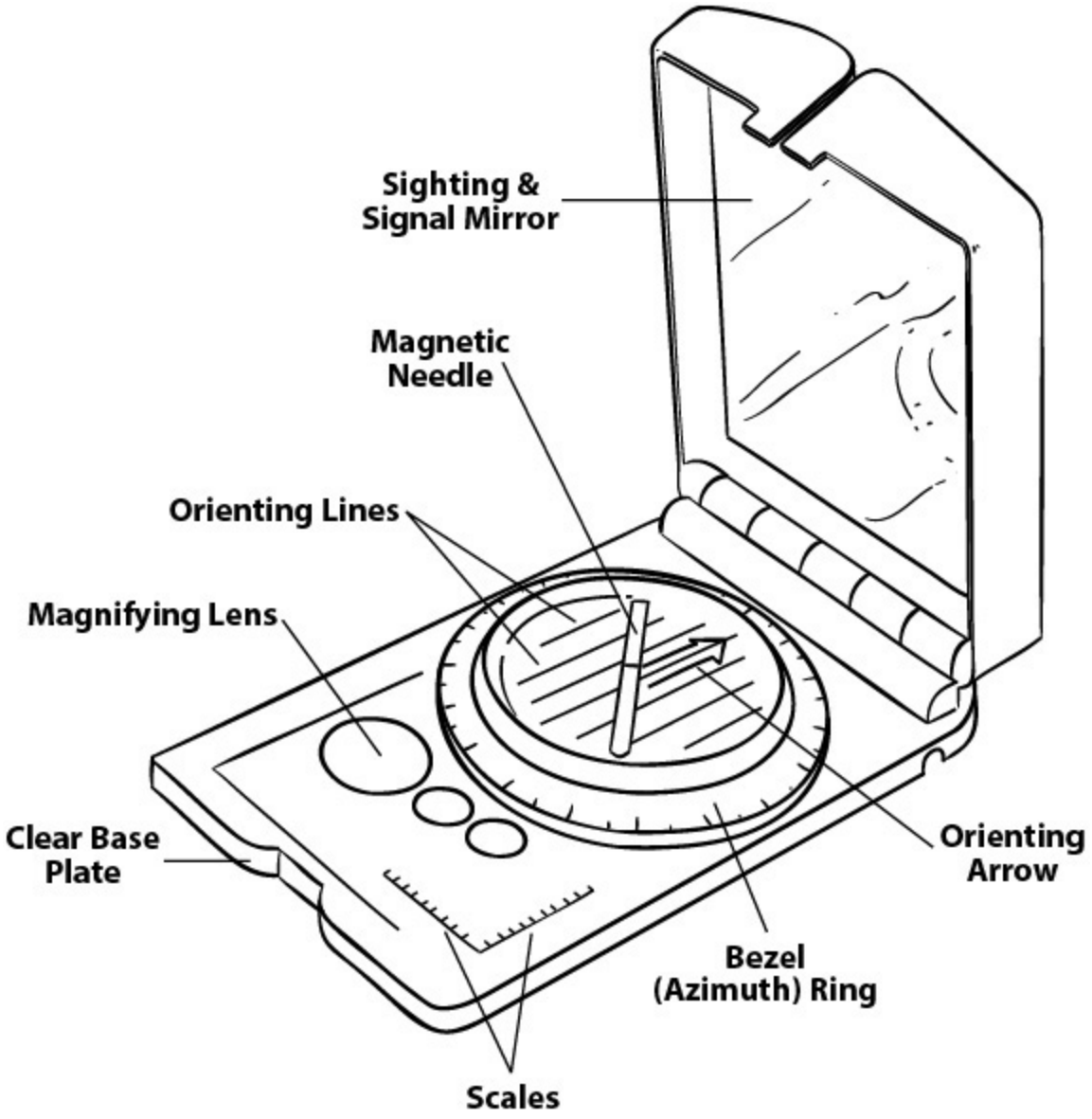
The most important reason to carry a compass is *so that we can walk a straight line over distance*. Everyone experiences what is called **lateral drift**, which causes us to gradually move left or right over long distances when walking. If you can see an object, you can easily walk straight toward it. However, if you go down a hill or an obstruction blocks your view of your intended destination, you will no longer walk the same straight line. This is why you carry a compass.

BASIC COMPASS USE

Beyond determining direction, the basic use of a compass is to establish a **bearing**. If your compass has the movable bezel ring with degree readings, you will be able to perform this task. Most compasses have a needle that is two different colors, usually red/white or orange/white. The white side of the needle points south, and the colored area points north. The “front” or “top” of the compass is where the mirror is, so if you open the compass and look into the mirror, your compass is pointed to the front. Under the bezel ring of the compass should be an outlined arrow or set of lines that move as the bezel ring is moved. This is important because you’ll use this to “plug in” a visual bearing.

TAKING AND FOLLOWING A BEARING

Once you understand the component parts of the compass, taking a visual bearing and following it is easy. Use the sighting device on your compass lid (this usually looks like a “V” gun sight) to aim at a distant object. Hold the compass centered on your body with your arms stretched partway out in front of you, away from your body. Tilt the mirror enough that you can see both the object in the distance through the “V” and the bezel ring on your compass. The needle on your compass will always point north, so at this point move your bezel ring so that the outline, or “doghouse,” lines up in such a way that the north needle is inside. You will then have the bearing at the top of your compass. At this point, if you lower your compass and keep the north needle within the line in the bezel ring as you walk, you will be walking a straight line or exact bearing.



Survival compass

LEAPFROG FOR LONG-DISTANCE TRAVEL

Trying to watch the compass as you walk may not be safe, in which case you'll need to leapfrog. To do this, you will use the bearing you just plugged in to sight on an object closer to you toward which you can walk without losing sight of it. Once you reach the object, pick another point on the same bearing and walk to it, and so on, until you get where you wanted to go. If you are given a bearing to follow or you have checked your map to

get a bearing, you can place that degree reading at the top of the compass and rotate your body until the needle is in the “doghouse.” At that point, you are facing the direction of the bearing, and you can proceed, either in a continuous movement or by leapfrogging.

UNDERSTANDING TERRAIN FEATURES AND MAPS

Remember that a topographic map is a two-dimensional image of a three-dimensional surface. So if you understand what you are looking at on the map, you can visualize what it looks like in real life. Here we’ll discuss the five most prominent colors and five most useful terrain features on any topographic map.

THE FIVE COLORS

Brown is used for contour lines. These lines show elevation; generally, contour lines are in increments of 20'. If you can find an elevation level written on a line near a hilltop, this will help determine the contour level. For example, if a contour line is 800', then 5 lines above that will be 900', and 5 lines below will be 700'.

Green is used for vegetation. Generally, the darker the green, the more dense the vegetation.

Blue is used for water sources, creeks, streams, rivers, lakes, ponds, and so on.

Black is generally a man-made object of some sort, such as a trail, a railway, or a building.

Red shows major roadways such as highways.

THE FIVE TERRAIN FEATURES

Hilltops are the highest point of elevation in a rise, offering opportunities for overlook.

A **ridgeline** is a series of hilltops. These areas will enable high ground travel; animals use them for the same purpose.

A **saddle** is a low area between two hilltops. These areas offer good windbreak for camps without sacrificing elevation. Hilltops and ridges drain through saddles into valleys below.

A **draw** is the reduction in elevation from a saddle with high ground on both sides. This is usually a good runoff point for water and in many cases leads to a valley.

A **valley** is a low elevation running between ridgelines. These areas hold runoff and are the best places to look for unmarked streams. If they hold water, the higher ground above them will be excellent for ambushing game that goes to the water to drink. Most valleys are also good trapping locations.

READING OTHER MAP DETAILS

Once you can read the basic features of the map, you need to understand the other information that it can provide. The map can give you distance from one point to another, as well as show you the differences between what your compass is reading (called magnetic north) and the what the map has laid out (called grid north). This information will be important if you plan to travel using your map to obtain bearings.

The **map scale** is a reference usually at the bottom of the map that tells you how many inches on the map equal a certain distance on the ground. Maps are scaled in numbers like 1:10,000. This means that 1" on the map represents 10,000" on the ground. The scale bar on the map makes this easier for you by showing a measuring device broken into inches or centimeters so that you can accurately measure with a ruler and convert that

to distance. It is also important that you decide whether you are going to work with the U.S. system of measurement or the metric system when making calculations. Most of the examples I use in this book are in metric system, as I find everything divided by tens to be easy math.

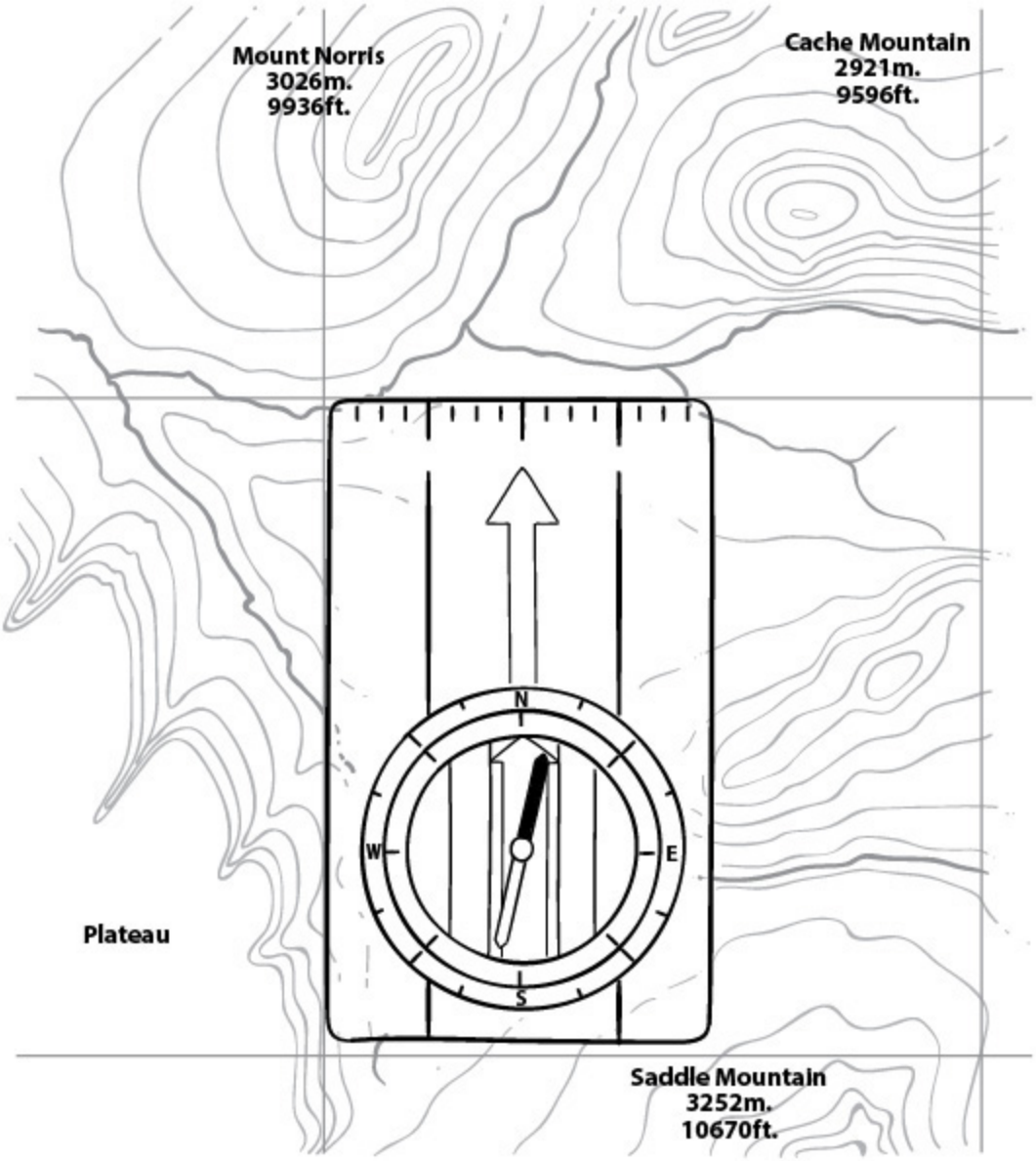
ORIENTING THE MAP

For rudimentary navigation, you do not need to worry much about the declination differences between grid north and magnetic north. However, if you are trying to be very precise over distance and intend to take your bearings from the map, you will need to understand this process. Your map contains a **declination diagram**, which will show you the amount of degree offset left or right between magnetic north and map north. The top of any map is oriented north. Think of straight up on the map as corresponding to the hands of a clock pointing to 12. Magnetic north is actually left or right of 12 o'clock, depending on where you are standing on the earth's surface. Your compass always points to magnetic north, but the map is made to linear and lateral direction, so north on the map is not magnetic north. This difference is indicated in the declination diagram as a **degree of offset**. Once you find the declination diagram, you can do one of two things:

Set the declination difference in your compass if it has adjustable declination.
Use the calculation based on the degree of offset on every bearing you take from the map when planning your route.

Orienting the map is important if you want to match the two-dimensional image on the map to what you're seeing in the landscape before you. It is also important if you are planning a route while basing your planning on the

map alone. To orient the map, place your compass fully opened on one corner so the straight edge of your compass and the grid lines on the map are parallel. If you are using this map to figure a route and to factor travel bearings, to start this operation you will need to either have the declination difference set on the compass or offset your bezel ring that amount from 360° at the top of the compass. When you've done this, rotate the map until the north needle is again in the doghouse. The map will be oriented to the terrain in front of you. Make sure that when you begin this procedure your map compass top is toward the top of the map.



Orienting the compass

MEASURING DISTANCE AND TAKING BEARINGS

Once you have found the scale on the map, you can use any device for measuring, from a string with knots tied in it to a piece of paper with tick

marks the same distances as the scale. Laying this object between Point A and Point B, you can calculate distance to be traveled.

TAKING A BEARING OR AZIMUTH FROM THE MAP

Once the map is properly oriented, you can use your compass to take bearings or **azimuths** from the map. (“Azimuth” and “bearing” are fairly synonymous words, meaning the direction of travel.) To do this, do not move the map. Lay your compass with the straight edge between the point where you are and the point you want to get to. Then rotate the bezel ring until the needle is in the doghouse. The bearing at the top of the compass will be your travel bearing.

FIVE NAVIGATION METHODS EVERY WOODSMAN SHOULD KNOW

Handrails are linear objects within the terrain you can use as a guideline to follow when they lead in the intended direction of travel. A creek bed, ridgeline, river, or roadbed could all serve this function to help you navigate to a location without following a compass bearing.

Backstops are a point you know you should not go beyond. These are generally linear land features that run perpendicular to your intended destination. A backstop could be a river, stream, roadbed, or railway. It need not be right on top of the intended destination, but it should be close enough that you’ll know, if you hit that feature, that you have passed your mark.

Baselines are the opposite of backstops; these are used for returning to where you started from and should run perpendicular to a

campsite or base camp. When you've arrived at the baseline, you should understand which way to go to get back to camp without having to be precisely accurate with a compass bearing.

Aiming off is (usually) done in conjunction with a baseline. You will purposely take a bearing left or right of the intended destination a few degrees, so that you know on arrival to turn left or right to arrive at the desired location.

Panic azimuths are created so that if you get lost, you have a bearing to immediately plug into your compass that will take you to a known point. For instance, say you are traveling north, and off to the east is a river that is not a part of your intended travel route and is not a handrail. However, if you get lost, you know that a direct west azimuth from the river will take you back toward your intended course. From there, you can use that as a baseline to get your bearing for travel again or get you back on track.

REVERSE OR BACK AZIMUTHS

Sooner or later when traveling by compass, you will stray off course. When this happens, you should attempt a **reverse azimuth** to return to the last known point. A reverse azimuth just means traveling 180° in the opposite direction from where you were going. The easiest method is to simply look at your compass as if it were a clock. If your current bearing is at 12 o'clock, rotate the bezel to the 6 o'clock number, and you have the reverse azimuth.

DETERMINING DISTANCE WHEN TRAVELING

An important thing to realize is not only how far you have to travel but also how far you have traveled already. It is great to look at a map, break out a measuring device, and know your destination is 2.5 kilometers—klicks—east of you. But how do you know how far you have walked once you are on the way? **Pace beads** are the answer to this question; these are used to measure distance traveled.

To use them, create two strings of beads: one strand of nine beads and one strand of four beads. These are used to count 5 kilometers. Each bead on the side with nine beads represents 100 meters, and each bead on the side with four beads represents 1 kilometer. You will start with all beads at the top of the two strings, and drop beads accordingly as you travel in 100-meter increments. The key to this is figuring how many paces it takes to walk 100 meters.

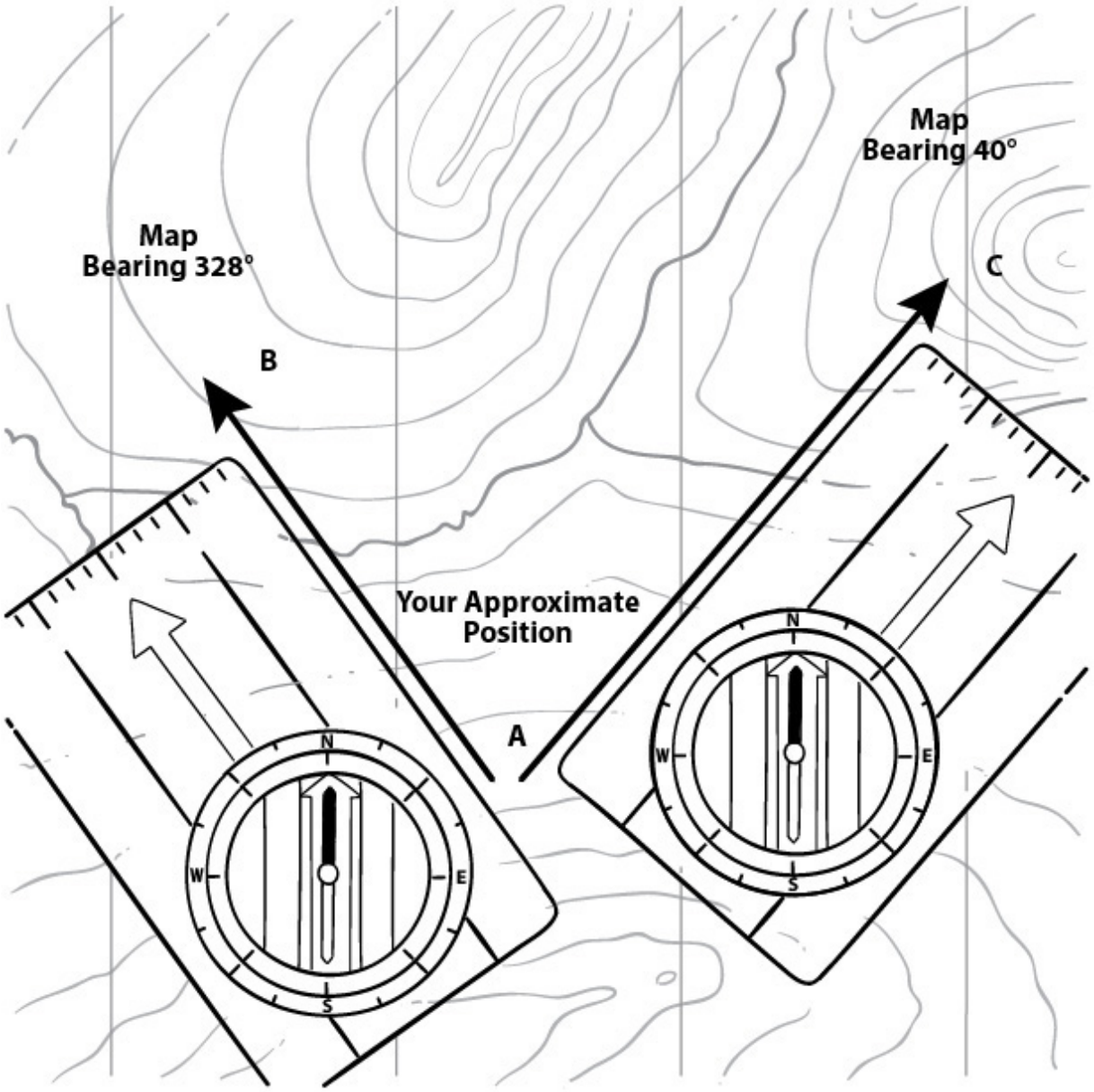
To figure your **pace count**, or how many paces it takes for you to travel 100 meters over land, you must consider several factors. You should have a journal in which you keep personal notes for use in and around camp. Within this notebook you should record your pace counts. Check your pace in all terrains and always with the gear you intend to carry. Record your pace for flat terrain, uphill, downhill, uneven ground, etc. This way you can average, when needed, for multiple terrains. Your pace counts are figured in full paces, so if you step off with your left foot, your count will be on every strike of your right foot.

FINDING YOURSELF (SELF MAPPING)

Some folks assume that having a map and a compass will keep them found. However, if you don’t keep track of where you are and wind up lost, it can be very difficult to figure out where on the map you are.

If you can find even one identifiable feature that is on the map, you may be able to complete **resection** to find where you are. Look from high ground at two different features on the map. Maybe you have found a fire tower and you can see two hilltops from where you stand. If this tower is the only one on the map, you're all set, but to verify this it would be good to do resection from the tower.

Take a bearing on the objects you can see from where you are standing and use the reverse azimuths to draw lines on the map. If these lines intersect at the fire tower (in this case) from the two hilltops, you have verified your suspicions that the tower is the one you can see on the map. This sounds easy in this example, but in deep woods or summer growth it can be nearly impossible, so it's best to watch the map from the start and navigate by all the methods listed here to stay aware of your current location.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Resection

BUSHCRAFT TIP

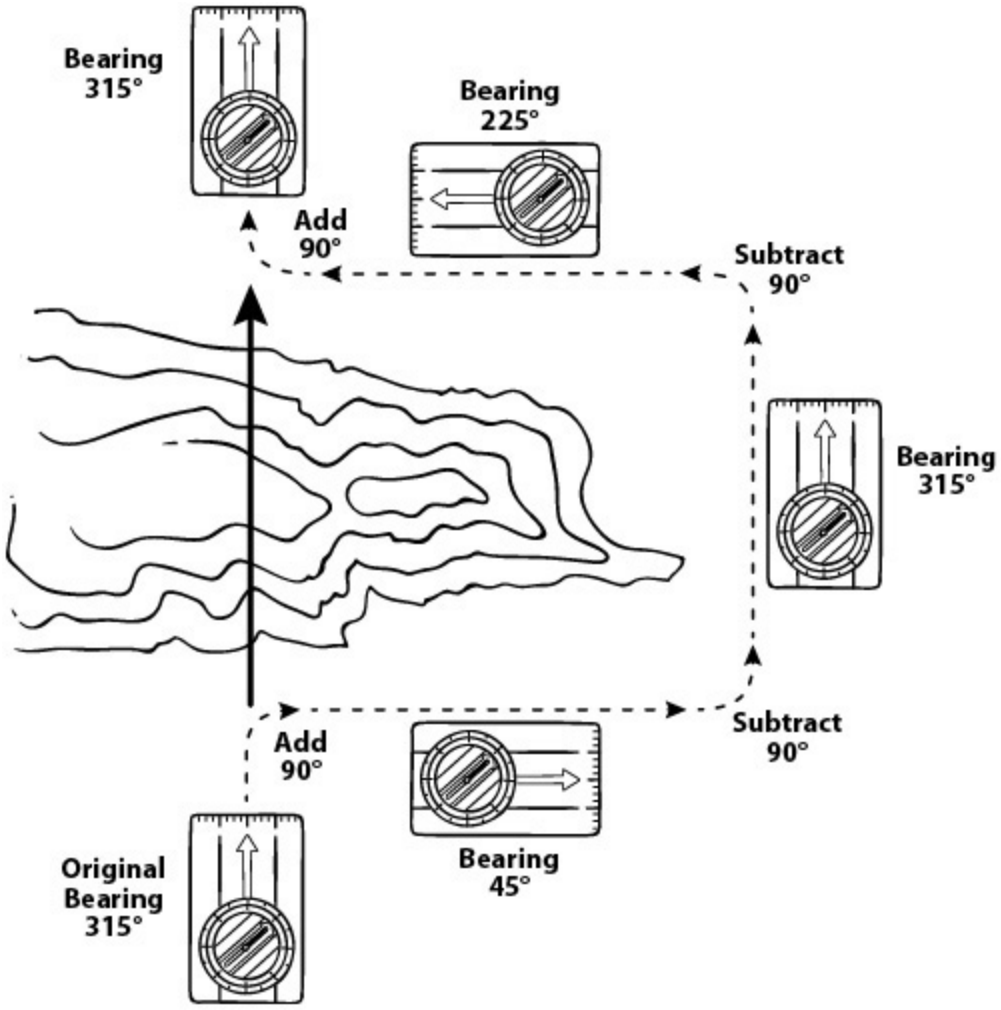
Here is a funny story that demonstrates just how easily folks get lost. I was in the woods one cold winter morning less than 200 yards from a main road where my vehicle was parked. After about thirty minutes I heard another vehicle drive up and park in close proximity to my own. I began to hear a crunch of snow coming from behind me; it did not sound like a deer but more like a human. As I sat in my stand I watched a hunter walk past me. He walked about 50 yards, then stopped, looked around, turned left and walked a few steps, and then he stopped and looked around again. After a couple of minutes he walked a few yards back to the right. At this point he began to look around him as though he was not sure exactly where he was; mind you, he was only 200 yards from a main road! After about ten minutes of wandering in what looked like small circles from my perch in the tree, he sat down by a tree, and I could tell he was not hunting—he was visibly fidgeting with his gear and acting like he was a bit nervous.

After a few minutes he began to walk again, but this time I coughed so as not to scare him too bad by calling out. When he looked in my direction I simply said, “You car is behind me about 200 yards.” He replied, “I knew that,” and walked off abruptly. Upon seeing my car, he should have known when he entered the woods that someone else might be about, and from his behavior I am certain he was lost within 200 yards of his car. In areas with lots of features that all look the same, like trees, one can become disoriented quickly. You should always take a bearing from where you start so you at least know the direction to return.

OBSTACLES

You may encounter many obstacles during your tramps, and you may have to either circumnavigate them or cross them. Circumnavigation of an object, such as a lake or pond, is pretty simple. You can choose to do one of two things, depending on the situation:

Find an easily identifiable object on the other side (if you can see that far) that is in the same line as the bearing you are traveling. Walk around and take another bearing from that object.
If you cannot see the other side of the obstacle, or there is no reliable way to identify something on the other side, then you will need to **90-90-90**. With this method, you will use your pace count. Stop at the edge of the obstacle, turn left or right 90°, and pace count until you get beyond the obstacle. Then, turn 90° forward, and walk until you have avoided the obstacle. If you are pace counting for distance, this leg needs to be recorded. Now turn 90° in the opposite direction, and walk the same number of paces you did on the first leg, creating a three-sided box. This will bring you back to the bearing you were on before encountering the obstacle.



Obstacle

If you must cross an obstacle, it may be necessary to determine the distance across it. This might be true if you need to cut a tree for assistance in crossing, or if you have a rope and need to determine if it's long enough for a rope crossing.

Identify something that you can easily see on the other side of the obstacle.

At the edge of the obstacle, drive a stick into the ground directly in front of the object you identified.

Take a compass bearing to that object, turn left or right, and walk a straight line until you achieve a 45° difference with a compass reading from the original bearing to the same object. You have now created a right angle. The distance in paces back to your stake will be the same as the distance across the obstacle.

PAUL (POSITIVE AZIMUTH UNIFORM LAYOUT) METHOD

Using the **PAUL method** will allow you to scout an unknown area and figure a straight line bearing back to camp without backtracking by reverse azimuths all the way. This can come in very handy if you have covered quite a bit of distance. To use this method you will need to set up a log page in your journal for notes, and you will have to record bearings and distance to each point along the way. The easy way to accomplish this and still get your scouting done is to carry a flag or bandanna that is highly visible, preferably one that is orange.

Take an azimuth from your camp to a distant object. In your journal, record the azimuth and distance as you walk to it. Once you are there, place your flag on the object and continue scouting around the area—but never lose sight of the flag. When you are ready to move on, go back to the flag and take another reading to a distant object. Walk to it, recording the bearing and paces again in your journal. Place the flag on the object and scout around.

Continue this procedure until you are ready to return to camp. Draw a map in your book on a small scale, using the points and distances you have recorded. Decide the scale based on any measuring device—for example, 1" = 100 meters. Once you have drawn the map, (and this could easily be done

with sticks on the ground or with rocks), check your return azimuth from the last point to your camp and the distance. You should then be able to travel back in a straight line. If you have camped along a creek or water source, you have a ready-made backstop.

FIGURING DAYLIGHT HOURS

There will be times when you want to know how much daylight you have left. It is prudent to set camp at least two hours before sunset in the summer and four hours in the winter, because of supplies needed for a comfortable night, such as wood. To figure this out without a watch, lift your hand up with your thumb tucked under and your fingers together. Place your hand under the sun. Every hand you can place between the sun and the horizon line going down equals one hour, and each finger represents fifteen minutes.

TIPS AND TRICKS FOR SUCCESSFUL NAVIGATION

L.U.R.D.: Left, Up, Right, Down. Remember that while the earth moves, it makes the objects in the sky move as well. Plant a stick in the ground and lie down on your back. Looking at the top of the stick like a gun sight, line this up with a star. After several minutes, the star will appear to have moved as the earth has rotated. If the star moves left, you are facing north. If the star moves up, you are facing east. If the star moves right, you are facing south. If it moves down, you are facing west. The movement can also occur in combination: Right and down would be southwest. This method will work for any star except the North Star.

Remember that the moon travels in roughly the same arc as the sun, and at night makes a great navigational aid. It rises in the east and sets in the west, with its zenith hours of 10 P.M.–2 A.M. being in a southerly direction when you are looking at the moon.

A crescent moon can be used to easily find a southern direction in the Northern Hemisphere. An imaginary line drawn from the top crescent to the bottom of the crescent and to the horizon will indicate a southerly direction.

When traveling, it is always a good idea to look back at where you have been. On the return route, things will look more familiar if you have seen them from that angle before.

When using any method of navigation to get general direction other than a compass, check at least three methods for verification.

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Chapter 9
TREES:
THE FOUR-SEASON RESOURCE

"From the most ancient times, human beings have had a primal belief that plants contain healing powers."

—MATTHEW WOOD, *THE BOOK OF HERBAL WISDOM*, 1997

Since all plants have a growing season, many of the plants you would use for anything from edibles to medicinal purposes have a very short season in which to take advantage of them. Trees, however, are a bit different; many of their resources are available year round, the most important being construction materials and medicines. By looking at common trees and the properties they have, you can identify a few that will give you the greatest variety of resources. This chapter details the most important—and resource-rich—trees that will be useful for your time in the bush.

PINES

Pines, being evergreens, keep their needles all year round, and this can be a vital resource in the bush. White pine is the best for medicinal value, and red pines are the best for other things such as fire-starting materials and construction tasks. All pines have edible seeds (although harvesting the nuts of most eastern species may be more trouble than it's worth). In the spring,

young male cones (male cones are smaller and usually lower in the tree; they are usually coated in a dusty pollen and will never produce seeds) can also be eaten either raw or cooked, and the inner bark of pine is also palatable when separated into strips and fried crisp.

MEDICINAL VALUES

White pine needles can be made into an infusion very high in vitamin C that makes a good immune system–boosting drink. To accomplish this, collect a handful of needles, cut them in thirds, and place them into 8 ounces of boiled water. Place a lid on the container, and let them steep away from the fire for fifteen minutes. Strain and drink three times per day in winter or when food sources are scarce.

FIRST AID

Pine sap is a great resource for first aid as well as being an adhesive. In its raw form it can be used like a quick “new skin” plaster that will help cover a wound and is antiseptic. Pine sap can be found anywhere the tree has sustained injury. If it is needed and you can’t find it, a purposeful cut to the tree with an axe will usually reveal a small amount fairly quickly. If you anticipate needing it over the long term, create areas along your route for future collection, using this same method.

Cut the outer bark from small branches into a strip to use as a makeshift plaster that is highly antiseptic and sticky on the inside as a result of the sap.

FIREWOOD

Fatwood is the resinous area of the pine tree that sap collects in naturally (see Chapter 7). Any area of the tree where a branch grows from the trunk will contain some fatwood. If the pine is dead standing, the sap will run to

the base of the trunk and root areas. This fatwood can be identified by its thick appearance and feel when cutting, and will have a distinct turpentine smell. This wood is excellent fire-starting material and highly flammable both in fine shavings and in the form of feather sticks.

White pine also makes a decent kit for primitive fire-making, such as a bow drill set, but care must be taken to stay away from heavy resin-laden areas of deadwood for this task.

ADHESIVES

Pine pitch is made from a mixture of pine sap, charcoal from the fire, and some type of binder to give some flexibility, such as cattail head fibers or ground and powdered rabbit droppings. This makes a great adhesive for anything from patching containers to hafting an arrowhead or blade. The steps for making this mixture are as follows:

In a metal container, mix in the pine sap, charcoal, and binder material in equal parts.
Slowly heat and stir over a coal bed until it becomes a thick paste. Try not to let it catch fire, if possible, as this can make the pitch brittle.
Once the paste hardens, it can be stored. To reuse, heat it to the melting point.

Pine pitch works for making bandages, but remember that it will be hot, so be careful not to cause further injury with a burn. Once it is made, you can let it dry in the container and then reheat it when needed again. Or gather the pitch into pitch sticks for later use by turning a stick in the paste a bit at a time, like cotton candy, and allowing the pitch to dry on the stick. Reheat the hardened pitch until it softens and apply it in paste form.

BUILDING MATERIALS

Pine boughs are a great building recourse for many winter needs and can be used for bedding as well as shingling for shelters built from natural material. Remember that any bedding should be 4" thick compressed. When using plant materials for shingling, they should be interwoven so that they are upside down to the way they grow. This will create a shelter that sheds water, and resists water collection, preventing shelter leaks.

Pine and spruce pine roots make very passable cordages, especially for quick bindings and shelter building. You can find the roots just below the ground's surface and can pull them up in long sections. Pieces thinner than ⅜" will work best. If the outer bark of the root needs to be removed for better flexibility in your intended use, do this by pinching the root between two short sticks in the hand and pulling the root through. This vise will remove most of the bark.

WILLOWS AND POPLARS

These trees are all in the same family, and the four most common of these in the eastern woodlands are white and black willow, tulip poplar, and cottonwood. Poplars are some of the best trees for construction and combustion. All of these make excellent fire sets for primitive combustion (bow drill); all of them have inner barks that when dry can be processed into highly flammable bird's nests and tinder bundles.

Willow trees are very pliable, especially when young, and the bark makes great basket material and camp cooking implements. Because these woods are very soft, they make great carving materials for things such as bowls and spoons. In the summer, the barks can be removed in large pieces to create containers and quivers.

Willow bark has been used for thousands of years as a painkiller (like aspirin). It can be chewed, or you can prepare a decoction. See Appendix B for more information on making decoctions.

Willow is a great water indicator, as the trees require very moist soil to grow. Tulip poplar is among the tallest trees in the eastern woodlands, and because it drops its lower branches as it grows, it is a great place to seek fire-making materials. Other common trees in this family are saw tooth aspen, quaking aspen, and poplar.

BLACK WALNUT

Black walnut trees have many useful purposes and medicinal properties. We derive three main chemical compounds from this tree: iodine, tannin, and juglone.

- **Iodine** is a beneficial first-aid element for its ability to kill germs. In addition, it is what gives the black walnut its quality as a dye for anything from fabrics to wood to metal traps. (To effectively stain metal traps, boil them in a container with the green hulls of the black walnut tree.) The green hulls are also effective in preventing rust: when rubbed raw on metals such as 01 tool steel and 1095 knife blades, it will give them a nice dark patina that helps prevent rusting.
- **Tannin** is an astringent. The green leaves of this tree used in an infusion are excellent for drying conditions such as rashes and poison ivy. (See Appendix B for more information on making infusions.) Tannin also makes a great chemical for bark tanning hides. A cold solution of bark and hulls will yield a deep brown–colored hide that can be broken and worked after a few weeks of soaking.

- **Juglone** is a poison that prevents or stunts the growth of many plants, causing them not to grow well around the tree itself. It can also be used in a concentration for a fish-stunning potion if you use it in a restricted pool of water. Crush the black walnut hulls and place them in the water to release these toxins.

SASSAFRAS

The sassafras tree bark is a carminative (i.e., expels digestive gas) and will help with digestive disorders of any kind. It makes a pleasant tea, and it is also astringent and can be used as a poultice for skin ailments. The wood burns hot and long because of the inherent oils in the tree itself. Sassafras can be used as a dye for fabrics as well, yielding a rusty red color. This tree's bark and roots are also high in vitamin C, making it an immune-system booster.

NOTE: Check medicinal side effects before using internally.

OAKS

Oaks are some of the strongest of building material in the eastern woodlands; they make good bows and handles, and the wood burns long and hot. The medicinal value of oak cannot be overstated. There are two main types of oak: white and red. There is a simple way to tell the difference: Red oak has pointed leaves and white oak has lobed leaves. Red oak is the better of the two for construction purposes, and the white oak is better for medicines. White oak is such a powerful medicine that it was used as a symbol for the European *materia medica* for several hundred years. The inner bark of the white oak, when ground and decocted, is said to be good for all ailments above the neck. In addition, any type of fluid

leakage can be controlled by this medicinal, from runny noses to diarrhea. Oaks are full of astringents and tannins. These trees are considered the "model astringent" by authorities such as Matthew Wood. See Appendix B for information on making decoctions.

TIPS AND TRICKS FOR MAKING USE OF TREES

In the winter, you can simply cut through the bark of an oak to see if the inner bark is red or white, signifying red or white oak species.

If decoctions are not a feasible option, you can chew the bark to attain a similar effect.

Chewing pine resin like gum will cause excessive salivation and curb hunger pains, as well as ease a sore throat.

Do any medicinal collecting from the healthiest-looking live trees available.

Any infusion or decoction should be used in 8-ounce increments three or four times per day.

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Chapter 10
TRAPPING AND PROCESSING GAME

"The first thing to be considered in reference to a campaign is the selection of a trapping ground, and it is always desirable to choose a locality where travel by water can be resorted to as much as possible. Otter, mink, beaver, and muskrat are among the most desirable game for the trapper, and as these are all amphibious animals, a watered district is therefore the best on all accounts."

—W. HAMILTON GIBSON, *CAMP LIFE IN THE WOODS*, 1881

The art of trapping is much misunderstood. Think about hunting: You have the opportunity to scan for animals and with your chosen weapon shoot any creature that enters your kill range, which could easily be 100 or more yards. With a trap, you have to entice an animal to place its foot in a 2" circle when you are not even there. Trapping is as much an art form as tracking, but there are many ways to increase your chances of success. Once you have studied the concepts of sign and landscape tracking, it becomes a matter of understanding **sets** (trap placement), patience, and statistics. The more traps you set, the more chances you have of catching something. However, this does not mean you should set traps without a proper purpose. Pay attention to **setting signs**—that is, signs that animals have been in the area. Often, if you set a couple of traps near camp, you will

not catch anything even in a few days, let alone overnight. Trapping is a game of percentages, and twelve traps should be a minimum number when considering this method to secure meat. I know that sounds like a lot, but it can be done with minimal materials in about an hour once you understand the basic principles.

UNDERSTANDING TRAP COMPONENTS

Almost all traps contain three major components: the **trigger**, the **lever**, and the **engine**:

> The trigger is the part of the trap that actually gives way to set off the trap. In a primitive trap this is often the bait stick, or the wire triggers of a Conibear, for example.
> The lever is usually the device that holds the tension employed by the trap and is released or moved by the trigger.
> The engine is what powers the trap. It can be gravity in the case of the deadfall or the bent sapling of a green tree or bush. Anything that causes weight transfer or stores energy is an engine.

Traps are designed generally to perform one of three main functions: crush, strangle, or live capture. (Or, as John “Lofty” Wiseman put it, Strangle, Mangle, and Dangle.) The type of trap you set and its function will depend on the game you desire to trap. Remember that while live food never spoils, handling an angry raccoon can be a dangerous game, so discretion in trapping is always wise. It is better to kill the animal and be safe than to have to dispatch a possibly dangerous animal.

CREATING SIGN POSTS

The object of a sign post is to discover what animals are frequenting an area you plan to use for trapping. This step is not necessary if you have already found many signs and realize what you are after and what is in the area. To accomplish this is easy. Select a good area of possible frequent travel and set a stick in the ground. Clear the ground around this area for about 2' square so that tracks will be visible if an animal comes to investigate. Once this is set up, any type of visual or scent attractant can be used on the stick to bring animals in. A good practice is to use both types of attractants. For example, you can use the entrails of a frog and a feather or a bright piece of cloth tied to the stick. Animals will notice things that change on their daily routes, just as you would if someone moved something or placed something new in your living room. The animals come to investigate and leave tracks, enabling to you to identify what types of animals frequent the area. From this, you will better cater traps and baits for those animals.

BUSHCRAFT TIP

Scent control is overrated! Yes, I said overrated. It's not necessary to go overboard in controlling human odor. Mammals are curious, and they are all "sniffers"—they want to know what has been where and why, and some are even attracted to stinky things such as your sweat or urine. I know a guy who actually used the leaves he wiped himself with after defecating on his sign post, only to find it had attracted several raccoons and an opossum. Human odor can be very detrimental to hunting at times, but scavengers aren't bothered by it. The lesson here is, things that smell bad sometimes make the best attractant, and worrying about covering your scent is unnecessary. Dirt and a smoky fire will do a lot toward covering your scent as it is, and unless you have some foul-smelling chemical or fuel on your hands, you will be pretty safe.

BAIT FOR TRAPPING

Animals eat certain things; they also have favorite things, as well as new things they have not tasted but would surely like to, just like you and me. Finding these things can be easy or difficult depending on seasonality. For birds, nuts, seeds, and fruits are always a good bet; these also work well for small mammals such as chipmunks and squirrels. If you have something in your pack that is new and different that falls into this category, you may be ahead of the game.

A cashew nut may be new to squirrels, and the sweet aroma will definitely attract them. For other animals that are scavengers, such as raccoons or opossum, any stinky thing such as frog entrails or half of a bluegill will work well. The key element to good bait is finding something

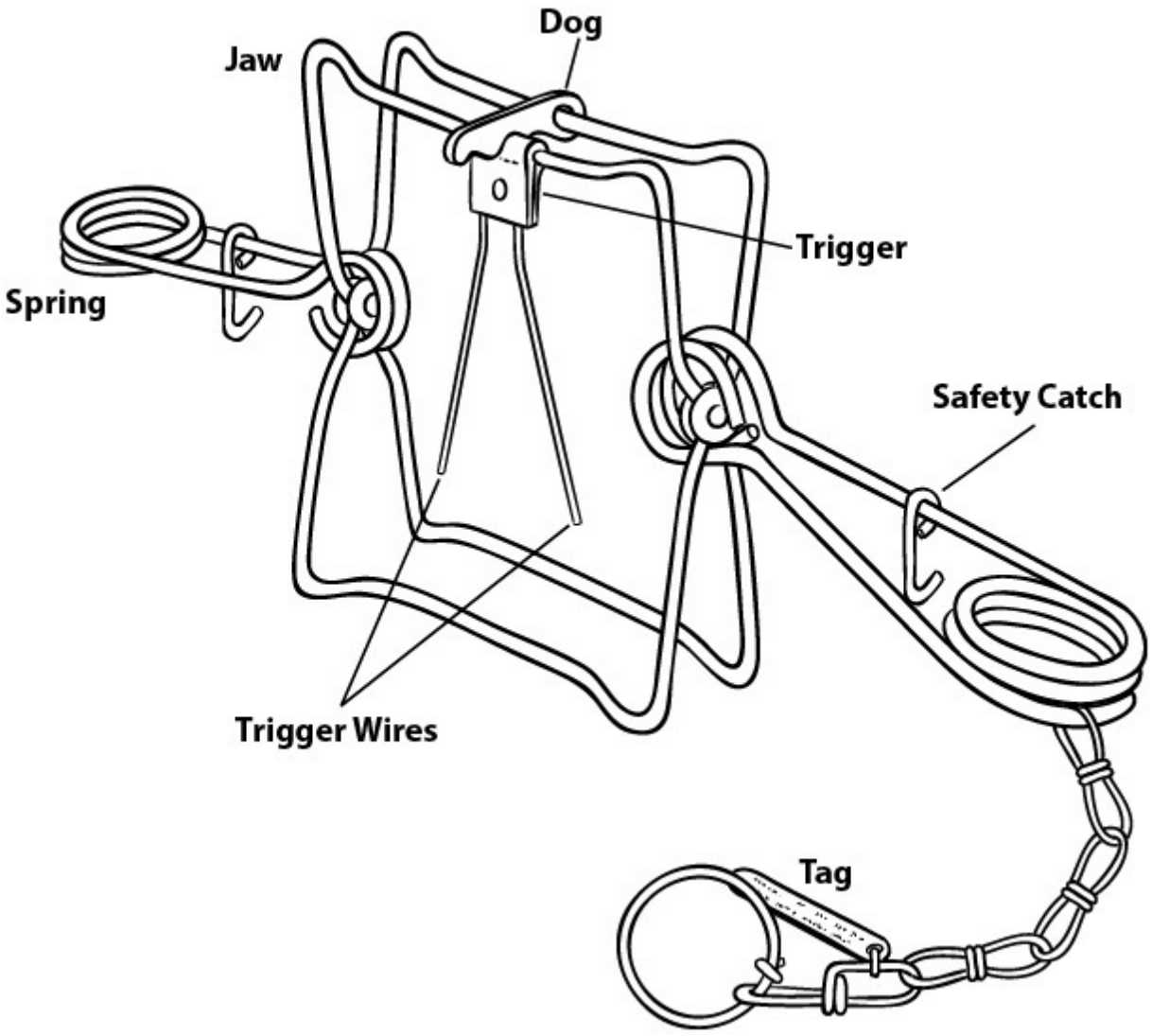
the animal wants that is not common to the area. If acorns are lying all over the ground, what is the chance a squirrel will pick the one that baits your tap? However, a lone walnut, broken to release the scent into the air, may be just the right ticket to attract the squirrel's attention. Birds like small fruit, so if you have to travel a bit to collect a few berries in an area where you know they are feeding on seed, you should do it!

MODERN TRAPS

The following section gives some basic uses for modern traps that I feel can be of the most benefit for a self-reliance-type kit. I do not cover all types of modern traps, only the ones that take up a small amount of space and are multifunctional. Modern traps are made of metal, so damage from animals or chew-outs (animals chewing through trap parts such as cordage snares) don't happen. These traps do take up space in your kit or pack and can be cumbersome in large numbers; carry about three of these in conjunction with steel cable snares and/or primitive trapping supplies.

THE #110 CONIBEAR

The **Conibear** trap (also called the "body grip"), named after its inventor, is probably the single most effective trap ever made. It has the capability to take all small game species, including water fowl, ground birds, and even fish, with a proper set. It is a killing trap, and very seldom will animals be found alive in it. It can be set to differing sensitivity levels and can be used baited or set with no bait. You can easily set the smaller #110 by hand, where the #220 is normally set using a tool, making it a less than optimum option.



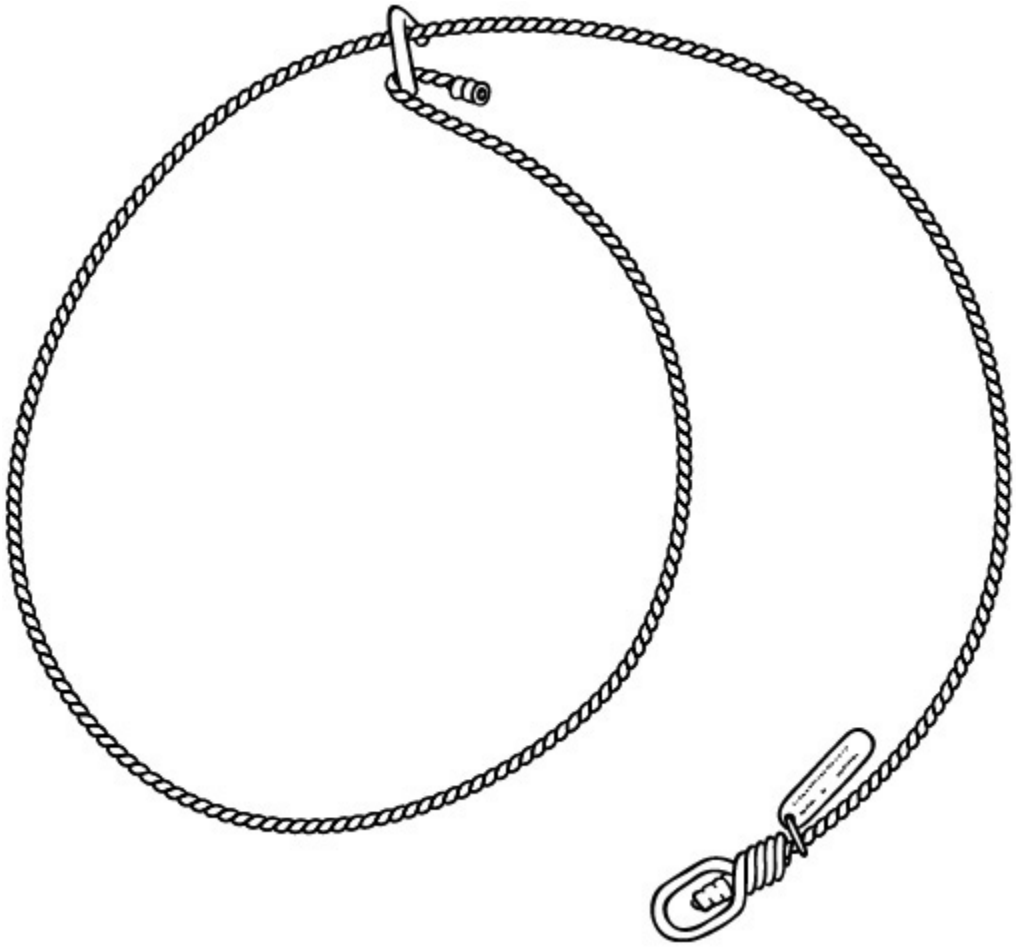
Body grip trap

CABLE SNARES

As the term implies, **cable snares** are snares made from steel cable. Their size depends on your quarry. Usually cable snares have mechanisms called locks that prevent the snare from loosening, so the more the animal struggles, the tighter the snare. This may seem inhumane, but it can kill the animal quickly.

A trap or snare engine is a device to activate the trap quickly, instead of relying on the animal's attempted escape to tighten the noose. An engine

can be a springy green branch, a counterweight, or a shock cord of some sort; it is only limited by your imagination. Cable snares are a good way to carry many traps without sacrificing a lot of weight, especially if they are of minimum size. These can also be fashioned from common materials. The only downside to snares is that they will most likely be useful only once—if an animal is caught, the snare will be twisted and kinked to a point of uselessness.



Snare

IMPROVISED TRAPPING MATERIALS

You can use many materials to improvise modern traps or those made from non-cordage materials:

> Picture-hanging wire obtained at any hardware store works well for making cable snares capable of taking rabbit-size game with ease. #4 wire is best for this task. One thing to remember when using wire is that small-gauge wire, when incorporated with an engine, can sever flesh or decapitate your prey.
> Guitar strings also make good cable snares, as long as you use the heavier-wound strings and not the thinner single-wire strings.
> Simple steel leaders used for fishing are a ready-made snare with simple adjustment, and will serve two purposes if carried—fishing and trapping.
> Rat traps are an often overlooked asset to a small trapping kit and are like a poor man's Conibear: very effective for smaller animals up to squirrels and small birds. When using rat traps for trapping, paint them a dull, earth-toned color and drill a hole in one corner to anchor them and keep them from being dragged away in case of a non-killing strike.

THE BASICS OF UPLAND TRAPPING

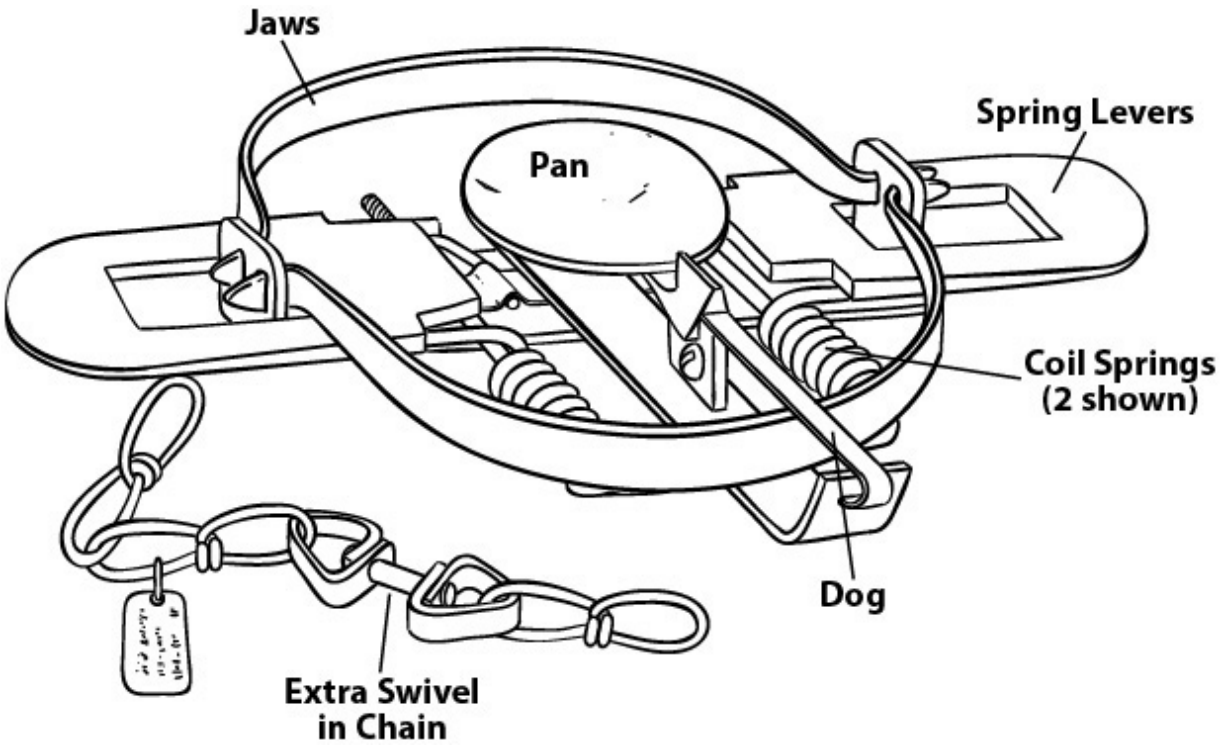
Upland trapping refers to setting traps above the water on higher ground for animals such as coyote, fox, raccoon, opossum, and other small land animals. Depending on the type of traps you are using and game you are seeking to trap, setting traps on land requires a bit more equipment than water trapping. For the purpose of this section, we will only discuss foothold traps; later we'll talk about snares and body grip traps.

A **foothold trap** is one in which the animal is held fast, generally by the foot, and remains alive until arrival of the trapper. There are five main components to such traps:

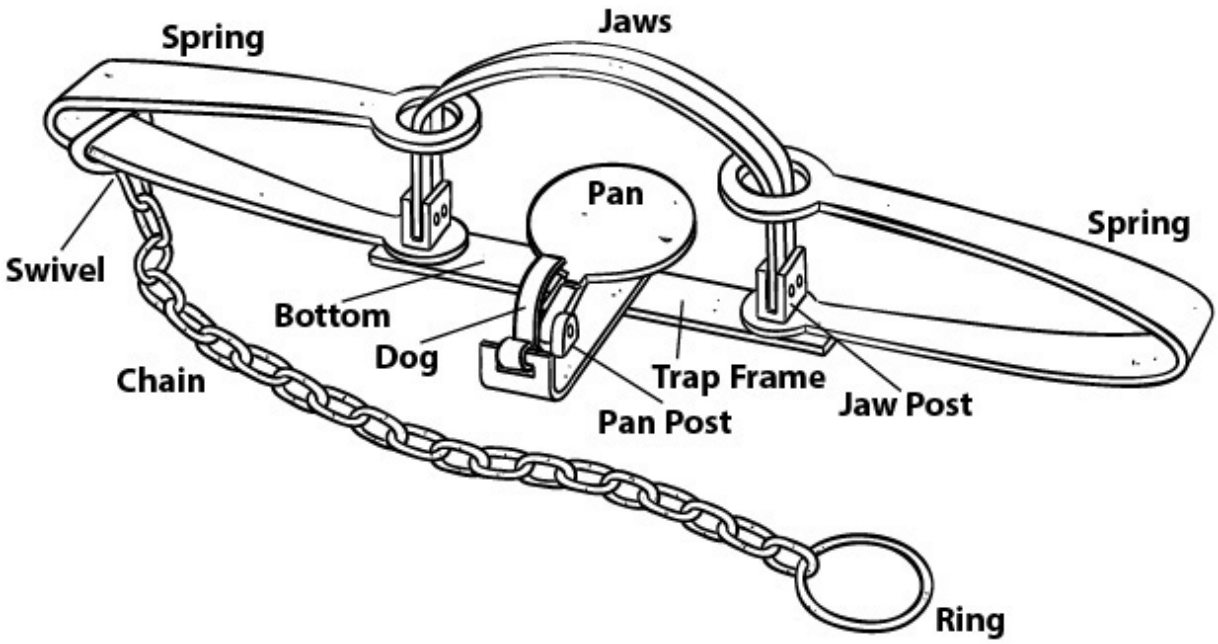
> The **frame**. This is the base of the trap to which all other components are attached.
> The **spring(s)**. These can be long spring(s) or coil spring(s); these operate the jaws to close them.
> The **jaws**. They are generally made of steel and are either offset or not offset, meaning that there is a space cut out so that the jaws have a bit of gap in the closed position. (This aids in the animal's comfort and help prevent "ring offs"—situations in which the animal's leg is cut off because of its struggles to escape the trap jaws.)
> The **pan**. This is the target area where you want the animal to place the full weight of its front foot when it approaches the bait.
> The **dog**. This is the level that holds the tension of the trap jaws. When the animal steps on the pan, this releases the dog, which lies over what is called the operating or "strong" jaw of the trap and is toggled in a catch notch on the pan.

There are three basic types of foothold traps used for upland set: the **single spring**, **double spring**, and **coil spring**.

A single "long" spring trap is a set of steel jaws that are closed by one power spring when the pan is tripped. A double long spring has two springs operating the jaws, and a coil spring can be single or double as well. A coil spring, as you might expect, is a spring made of a coiled piece of metal wire. In the days of old the mountain trappers carried mainly long spring traps and these are what are most familiar in image to non-trappers.



Coil spring trap



Long spring trap

Before we get the traps ready for use we need to speak about another important item: **Pan tension** refers to the amount of downward pressure required to move the pan down and release the dog. In newer traps, this is controlled by a screw attaching the pan to the trap frame. Tightening this screw will make the pan more difficult to move; the reverse holds true if it is loosened. Pan tension determines what type of animals you catch—it will take a heavier animal to release a trap with more pan tension, thus helping to reduce the chances you'll capture a non-target animal.

Attached to the frame of the trap is the trap chain. This is usually connected to a stake or anchor to keep the trapped animal from running away with the trap. The length of chain varies; I prefer about 18" of chain and at least three swiveling points. Swivels will help keep the animal from twisting the chain and further injuring itself while awaiting your arrival.

PREPARING YOUR TRAPS

Let's get our traps ready for use. When traps come from the factory, they are coated with oil to keep them from rusting in transport or storage. This oil must be removed so that the trap can be dyed or waxed or both. To remove this oil, boil the traps in hot water and then let them air dry until they lightly rust. Yes, you want them to get a light coat of rust, as the dyes and waxes will stick to the metal better that way. Once the traps are cleaned of any oil, they can be dyed with commercial products or boiled in black walnut hulls.

COMPANION EQUIPMENT FOR YOUR TRAPS

As with any other hobby, there are a lot of trap-related gadgets on the market, but you can (and should) keep things simple. You will need a screen to sift fine granules of dirt onto your set. For pounding stakes, the hammer pole of an axe will do, or even a large batoning log. For digging the trap

bed, an E-tool (entrenching tool), small hand trowel, or even a digging stick will work fine. A small brush for exposing the pan is very helpful, but I have found that blowing the pan off to expose it has no ill effect on the catch.

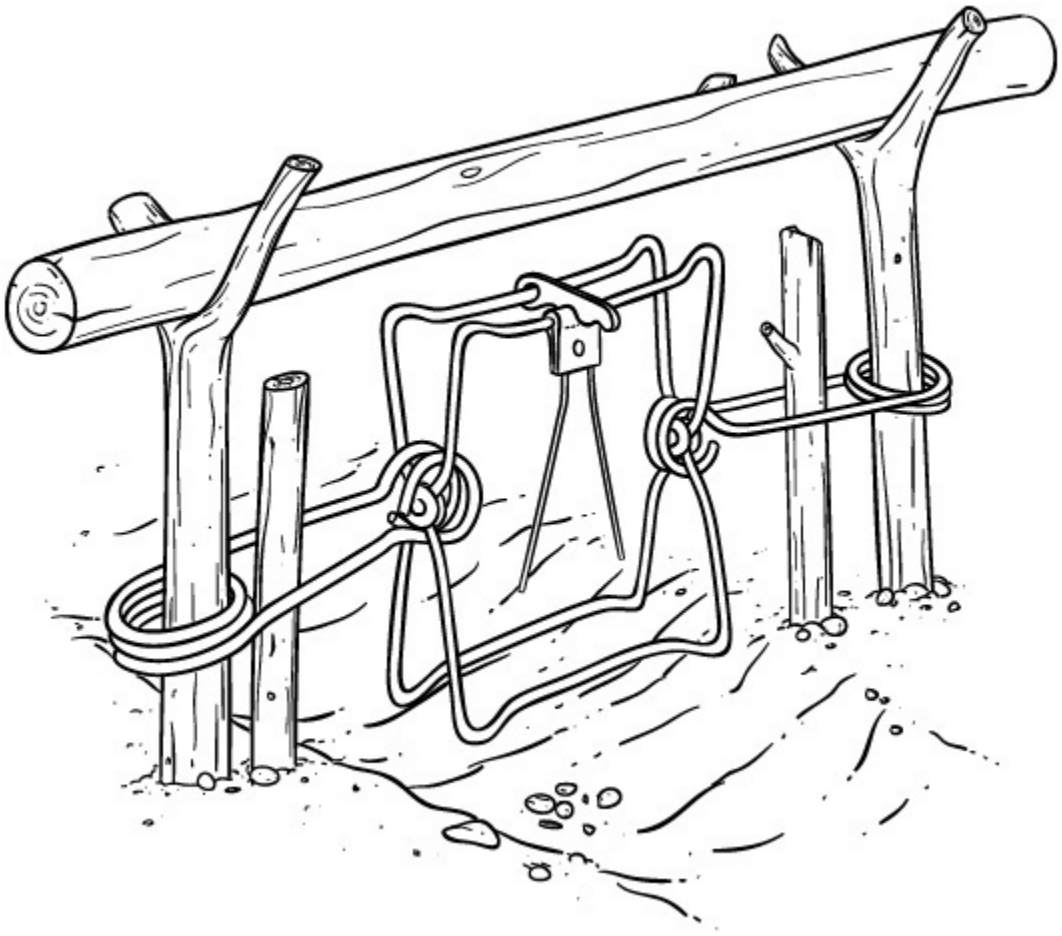
BUSHCRAFT TIP

A word on waxing traps: The reason you do so is to help them operate smoothly, as well as keep further rust from forming. It will also keep them operating if you use them in water or wet ground in freezing temperatures. The best wax for this operation is beeswax; you can buy it commercially if you don't have a homegrown supply. Dying the trap is not absolutely necessary; according to many experts, spray paint or nothing will work as well. As long as the trap is well lubricated with wax, it will operate and catch animals if properly set.

STAKING THE TRAPS

You will need large stakes or earth anchors to hold your traps in place. The two preferred methods for this are **rebar stakes**, about 2' long, or **earth anchors**. An earth anchor is a piece of angle metal attached to a cable. When driven into the ground, it goes straight, but when pulled upward it will turn sideways in the dirt below, anchoring the trap fast. I have met many old trappers who used wooden stakes to trap with. These can be fashioned from natural material easily enough, although this will force you to carry strong wire (16-gauge minimum) with which to attach the traps to the stakes. The main problem with earth anchors is that they are difficult to remove without a large levering device. However, using them ensures that

your catch won’t get away from you, nor will you lose your trap. All traps not secured by an earth anchor should be double staked.



Trail set

TRAP SETUP

With your equipment in hand, you are ready to set your traps. Remember, as with all real estate, the key is location, location, location! A trap set in the wrong place will usually not catch or will take longer to catch than one placed in a good spot. Most game travels on specific trails or routes, and these places are the best for your traps.

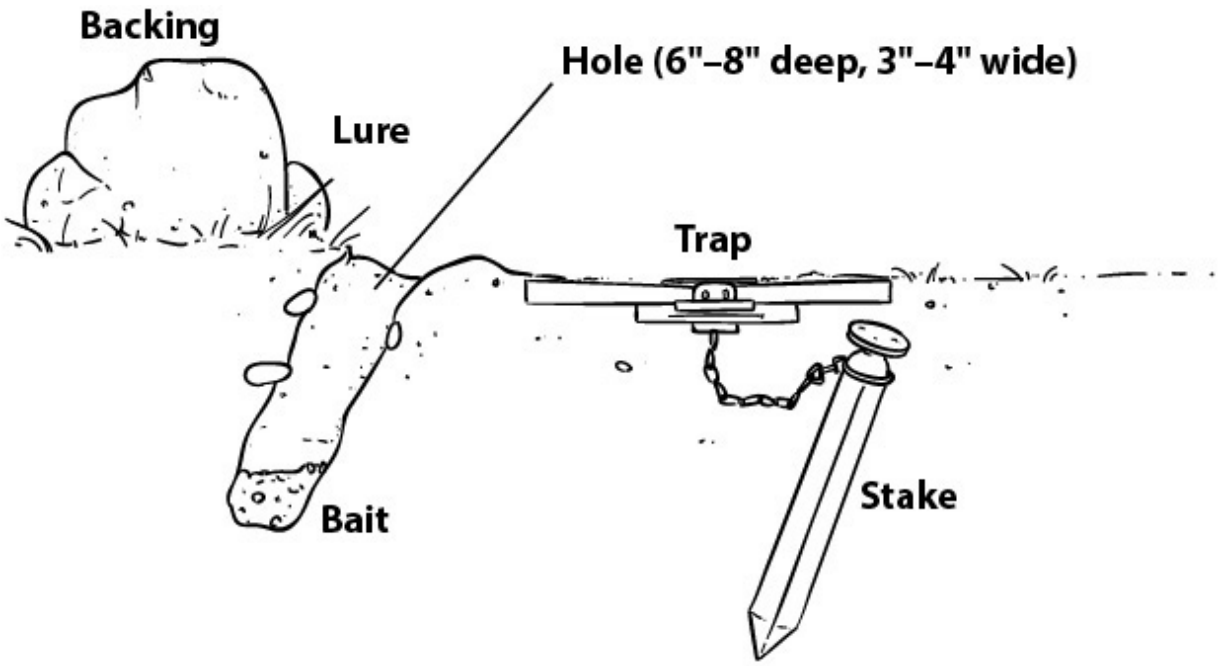
To begin with, look for signs that animals are there; tracks, scat, and refuse from feeding are all good indicators. Anywhere trails meet or

connect is prime location in a wooded environment. At intersections I like to set two traps at 45° from one another on opposite sides of the trail. The old saying goes, “If it was good enough to set one trap, it’s good enough to set two.”

You can set traps where trails meet open fields. High ground is generally preferred to low ground in open areas, as most predatory animals travel higher for good visibility to detect prey. When selecting your trap location, be sure to account for the wind; any bait or lure you are using to attract an animal will need to be upwind so that the smell travels well.

BAITING TRAPS

Baiting a trap is a key element to the setting of it. Most of the time you will want the animal to work to get the bait. Bait set on the trigger system of a trap, unless placed in a tray-style mechanism, should be attached to the triggering device so that it cannot be taken easily. In other sets, just placing the bait as far as possible to the rear of the trap can be effective enough to force the animal to trigger the trap. You want the animal to work for the bait as you are trying to trap him; you don’t want to feed him!



Dirt hole trap

MOST BAIT CAN BE FOOD

Remember that unless you are using pieces of other kills that you are not eating, such as entrails, most bait you use is also food that can be eaten to serve as nourishment for your body. The point to remember is this: How much bait do you have to use proportional to the amount of protein you'll derive from the trapped animal? If you're expending more energy to capture food than you're getting from it, you need to find another way of getting something to eat.

Another lesson I try to instill in all my students: Don't wait until you are hungry to secure food; this will only make things worse and lessen the chance for success. Just like anything else, hunting, fishing, and trapping use calories and energy. If you wait till the tank is empty, you won't have the resources to make your hunting efficient. One of the greatest benefits to attempting to find food in the wild is the fact that it occupies the mind. This

can work wonders in times of waiting in an SAR (Search and Rescue) scenario.

Does all this mean that you should not eat the legs from a large frog before using the rest of the uneaten bits for baiting a trap? Of course not; it means that you should pick and choose what you eat and conserve resources when you can for bigger meals, taking easy, high-protein, high-fat foods and using the other things to obtain more protein and fat. Always look to better your situation; that is what survivability is all about. Smooth it, don't rough it!

BUSHCRAFT TIP

The difference between baits and lures is simple: a **lure** attracts the animal by smell to the set location, and **bait** is something the animal wants to eat or investigate. Lures are usually made of glands or oils, and bait is usually food based. A good example of lure is skunk musk; it can bring animals in for a look from a very long distance. Bait consists of things such as raw meat.

TRAP SPECIFICS

With a good location selected, you must decide how large or small the trap should be and what trap to use. For leg-hold traps I prefer double long spring (DLS) traps. A small DLS will hold the same animals that a larger single spring will hold, but it will also catch smaller game. These traps are much more stable for water sets and generally safer as well as easier to set than single spring or coil spring traps. I prefer the #11 DLS made by Sleepy Creek. I have caught everything from opossum and raccoon to coyote in it.

I recommend carrying at least six of these in conjunction with snares and body grips, but three will suffice if weight is an issue. For longer-term meat and fur gathering, twelve would be better, but to carry that many traps you will need transport other than just a pack. For good all-around meat-gathering trapping, I carry no more than twelve traps in any combination. Carrying the right twelve traps for your environment will keep you in meat without hunting anything if you set them right.

Gloves, incidentally, are not necessary when trapping unless you are worried about safety. I find they are dangerous when setting my traps since they inhibit feeling in my fingers, which I rely on to set a trap safely.

DIGGING A TRAP BED

When you are ready to set your trap in a great location that will attract even the most wary of animals, begin by digging a **trap bed**. This is the area that conceals your trap so that the set looks natural. The bed must be deep enough to cover your stakes or anchors as well as the trap chain; insert these first and cover them before the trap is actually bedded on top of them. Bedding the trap is one of the most important steps in trapping. Believe it or not, if you create a perfect set with an imperfectly bedded trap, you'll wind up with your trap face down, still set, on top of the dirt. If the trap is not bedded solidly, it will rock in the dirt. When an animal is working your set and accidently steps on the outer or weak jaw of the trap, this causes the strong jaw to rise up in the dirt. This arouses the animal's curiosity and it will dig where the movement occurred, generally hooking the jaw of the trap and pulling it up. The game is over at that point.

The #11 DLS trap has two springs that act as stabilizers. Thus even if the bedding is not perfect, the trap does not rock nearly as easily as the coil spring trap.

Make sure the trap is properly bedded first, always according to the wind direction and with the dog toward the back of the set. This prevents the dog from blocking the animal's foot or pushing it out of the way of the closing jaws. After the trap is set and covered with sifted dirt, continue to cover the entire trap bed with sifted dirt. This is important because you do not want large clumps of dirt, debris, or rocks affecting the trap's operation or jamming within the jaws, causing separation and escape of the animal. Once you have completed the bedding, sweep lightly or blow off the dirt from your pan to expose it to view. This step helps you decide offset (the relationship of the pan to the actual dirt hole or baited area) and where your backing and dirt hole/visual attractants will be placed.

CREATE YOUR BACKING

Backing is the structure behind the set that prevents the animal from approaching from any direction but where you want it to come from. It can be anything from a semicircle of dirt, leaves, or other debris, to a log, tree, rock, or stump. Place a dirt hole against the backing to serve as a bait holder. The hole should be approximately 12" deep at a 30–45° angle. This does two things:

It forces the animal to approach from the front to get his eyes and nose in line with the hole.

It forces the animal to go deep to find the prize or dig—either way is fine.

Within the hole place some sort of attractant; there are many commercial baits on the market, of course, but you can use anything that stinks. I prefer Catfish Sticky bait, which comes in a large container; it lasts a long time,

and a little is all you need. As an alternative, anything that is left from the last kill will do fine. Just think stinky—anything rotten will work.

BUSHCRAFT TIP

Another great trick for the dirt hole is to bait the hole and then plug it with the tail from another kill, such as a rabbit or raccoon. This becomes a visual attractant as well. Remember that animals hunt by sight and smell, so visuals are always a good addition. Sometimes they alone are enough. Another technique is to use a prominent feature as the backing. This could be a large bone, burnt log, or anything that directly contrasts with the environment to attract animals visually to the set.

Bait or lure the item itself. You can shove bait into the bone cavities or even just place some guts under a large rock covered with a bit of dirt to seem as though it was buried by another animal. The object is to make the animal approach your trap from the front and stick its nose in the hole to work the set; this is where offset comes into play.

OFFSET

Offset is both left to right and front to back. Think about the animal: He leads with one foot, and it will be offset from centerline. You can force which foot that is by fencing. (We will talk about this shortly.) The size of the critter dictates how far the distance is from his nose to his foot. I have many times made a rear-leg catch on a smaller animal such as a fox or raccoon when attempting to set for coyote with a larger back set. I have found that for trapping of meat, a small 2–4" offset in both directions works

best. If you're attempting to trap larger predators, you will need a 6–9" offset.

FINAL STEPS

Once you decide your offset and are able to see exactly where your pan is, set up your dirt hole or visual attractant or both. Then place your backing if it is not a naturally occurring object. Once the backing is in place, you can worry about fencing.

Fencing is what you use to make the animal put its foot exactly where you want it to be. It can be very simple, such as some of the rough material from your sifter, which the animal will not want to step on. Try not to make any fencing or backing extend beyond the front or "loose" jaw of the trap. It will make the animal wary of placing its foot into the confined space if it extends beyond the trap jaws. In other words, for the jaw opposite the dog, there is such a thing as "too much fencing." You can then use secondary fencing, such as pebbles, sticks, and even chaff, to crowd the animal further toward the pan.

Once all these steps are complete, lightly cover the pan with sifted dirt; about ¼" is plenty. By this time, the pan should be the lowest part of the entire set. That is what you want because the animal will have to put its weight down to step there comfortably. When the set is complete, you can then bait, lure, place visuals, or all three. Scat from other animals is always a good curiosity booster, serving as a visual and olfactory attractant, as well as secondary fencing. Feathers placed into a dirt backing make a great visual attractant as well. A great teacher once told me that every set should have a BLT: "Bait, Lure, and a Turd."

WATER TRAPPING

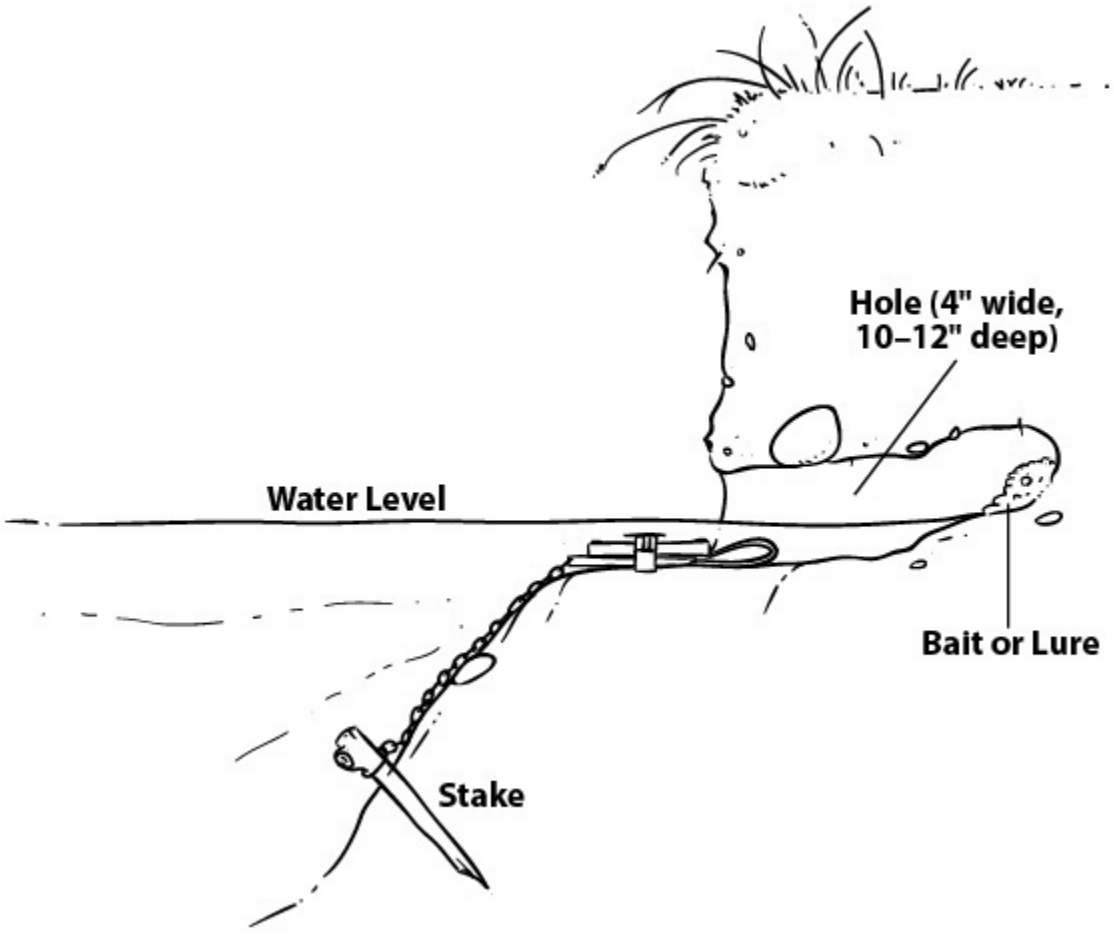
Land animals, in general, have fur worth more money but water mammals are much easier to catch and thus are a more reliable source of meat. Water trapping requires less finesse and less equipment than trapping land animals, and the bait will be readily available in the water or on the water's edge.

Simplicity is the name of the game here. Most of the animals in those areas are amphibious and are related to rats, so they are not that intelligent compared to canine and feline species. You will do well trapping in the water with a few double long spring traps from #1 to #3 sizes. With them you can catch mink and beaver.

Water sets require no bedding, as the water is your trap bed and the long springs will make stability a nonissue. The main sets used for water trapping are a **pocket set** or a **castor mound set** for beaver.

POCKET SET

A pocket set is a hole pushed into the bank, which you can make with the toe of your boot. Place the bait in the hole, the hole being just above water level, and center the trap on the hole. You can use fencing as well; set up a few sticks to direct the animal in from the front, forcing it to step on the trap pan.



Pocket set

CASTOR MOUND SET

For beaver, the best sets are called castor mounds. If you can catch one beaver, the castor yielded will catch the next, and the next, and so on. Castor is produced as a scent by a beaver to mark territory; there are castor glands near the base of its tail. This is a very attractive scent to all animals but especially attractive to other beaver.

Create a shelf at the edge of the bank to set a #3 double long spring trap about 10–12" deep in the water on the shelf, and offset about ½ the distance from one side to center to one side of center, left or right. On the bank, create a false slide by dragging your foot through the mud, as if a beaver has slid into the water on his belly. If you can find a genuine fresh slide, set

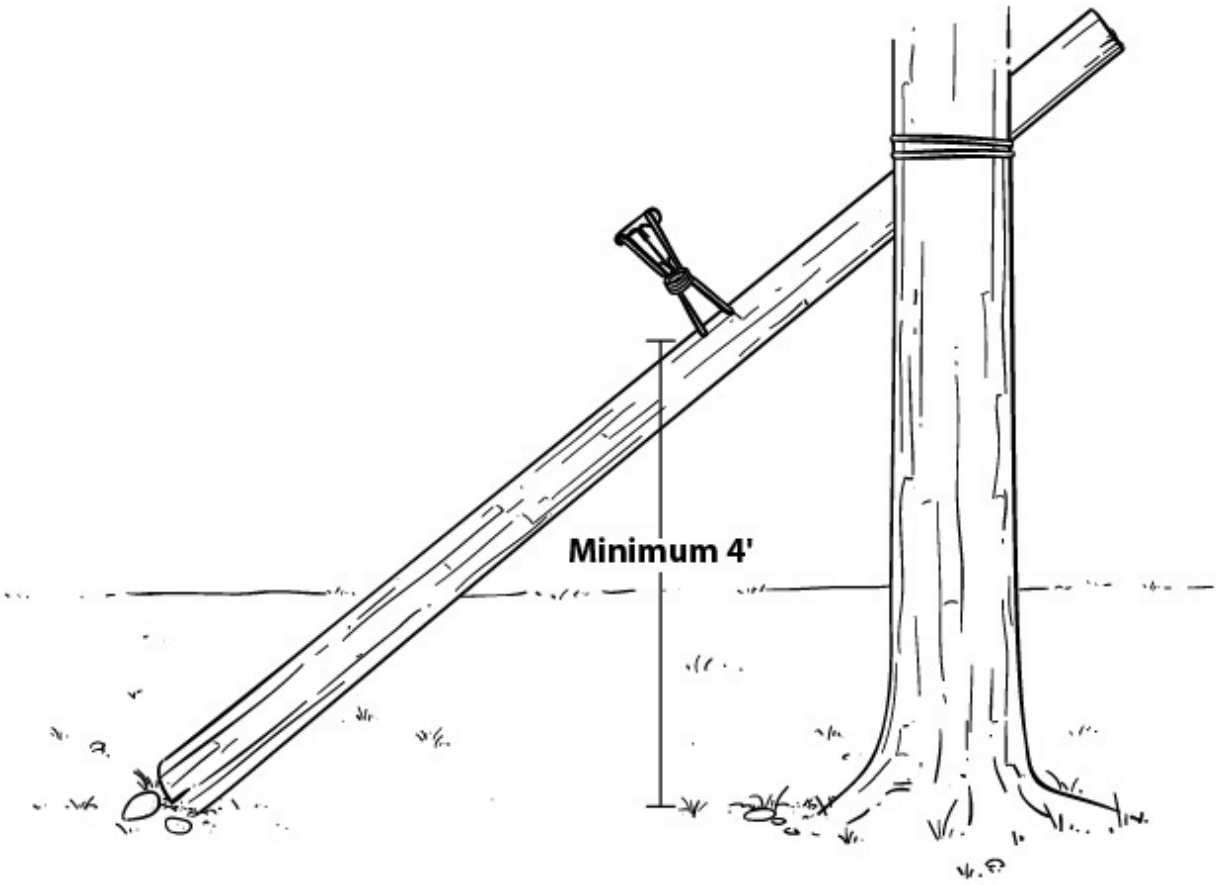
the trap here, as this may not require baiting with castor. Above the slide, place some fresh torn grasses and a few sticks you have freshly whittled. Place some castor on this pile if you have it. Beavers will constantly patrol the edges of the water and investigate these slides. As one bellies up to the bank, it will drop its foot into your trap.

Muskrats are very much like beaver, but if you can find a lodge or slide signaling their presence, these are also ideal places to use small #110 Conibears. Mink are carnivores, and muskrat is their favorite meal, so any muskrat meat you don't eat should be used for this. Raccoons and possum patrol the banks as well, and any rotten fish or smelly material will attract their attention.

Just as with fishing, large traps with heavy pan tension catch large animals; small traps with light pan tension will catch about any animal.

SPECIALTY SETS

In addition to the sets discussed earlier, there are some specialty sets. In this category, I would place one blind set (that is, set without bait) that you can create with wire snares: the **squirrel pole set**. Using this method, you set up an avenue or path of least resistance for the squirrel by leaning a fallen tree against another in which the animals are already living or are frequenting. They will invariably travel up this pole rather than climb up the main trunk of the tree. Using a series of open snares on this bridge will yield squirrels nine times out of ten. You can even drive the animals into the trap by spooking them off the ground to the trees.



Leaning pole trap

PRIMITIVE TRAPPING

Primitive traps have been used by ancient peoples since we became hunter-gatherers, and they are just as effective today as they were in ancient times. The biggest advantage to primitive trapping is that it takes a lot less gear carried to accomplish, and setup time is minimal once you own the skills. You can set a trap line of twenty traps in a matter of an hour once you are familiar with the system and used to doing it. This takes practice and dirt time just like any other skill, but it is as important an ability as fire-starting or shelter building.

TRIGGERS

The most important thing to learn in simple primitive trapping is one trigger system that can be adapted to many traps. In this way, you can pre-make several snares and adjust triggers and traps on the fly to fit the situation. A simple toggle trigger is all you need to set a variety of traps that will catch all small game, as well as birds and even fish for bank line sets. It is much better to be familiar with a few traps that employ this simple trigger than to have some knowledge of many complicated traps that require time and energy to employ. Carving complicated components takes time and much thought as well as adjustment to make them right, whereas straightforward toggles are just that simple, and many of these traps can be made using no tools at all. For every complicated trap you set, you can set many simple traps and obtain the same, or better, results.

BUSHCRAFT TIP

Many people overcomplicate primitive trapping! Trapping is very simple to understand. Any trap that effectively holds or kills an animal is all you need. I have traveled all over the world, and tribal people who are still hunter-gatherers have shown me that simple traps employing a simple toggle trigger are the best all-around trap to use for securing meat, and the ones they use every day for small mammals and birds. The KISS (keep it simple and sensible) method works for trapping.

DEADFALL TRAPS

Deadfall traps have been employed for centuries, most often used on smaller game such as ground squirrels, mice, and larger rodents. Deadfall

traps can be used with the same toggle-trigger system used for snare traps. This is called the "**Paiute deadfall**" after the desert Paiute Indians, who used it quite frequently. Deadfall traps need to be five times heavier than the prey to be killed; the trap will crush the prey. However, that does not mean the animal will be instantly killed—it may suffocate over time.

You can add combinations, such as a **cubby set**. Cubby sets are small holes like pocket sets sometimes used at the base of a tree or log. They are built over a deadfall trap to add weight to the trap and help disguise it to make it more effective. Traditional Paiute deadfalls employed large rocks as the killing device. You can adapt this trap to woodland areas using logs or the previously mentioned cubby set. Other deadfall traps for medium animals can be easily fashioned to employ larger logs by building a simple frame, yet using the same toggle trigger. These traps are limited only by your personal ingenuity. The main disadvantage to this trap system is the availability of component parts depending on where you are, and the time needed to build them.

BIRD TRAPS

Bird traps can employ the same snare-and-toggle system previously discussed, or they can be cage traps deployed to catch the bird alive, conserving it for later use. Many cage traps are used for smaller birds, but larger birds and waterfowl are better trapped using other methods, as discussed in the preceding sections. Cage traps work well for ground-dwelling birds such as quail, grouse, and pheasant. They can also be used for small perching species such as mourning doves and turtledoves.

Using a snare device to catch birds does not require the tensile strength needed for small mammals, so carrying multi-ply cordage that can be broken down in diameter is a big plus when trapping birds in this fashion. A

breakaway toggle system is used for these type of traps and can be adapted to deadfalls as well. The system for live bird trapping usually employs a trip wire or stick of sorts, forcing the bird to cross it to get to bait.

SMALL TRAPPING KITS

Trapping kits can range from elaborate to a roll of **bank line** (tarred nylon used for fishing and net-making) and a knife. I prefer the light weight of a small kit, relying on my knowledge and skill to employ a lot of traps. I carry a few items to help ensure success while keeping weight and space to a minimum.

There is something to be said for the bank-line-and-knife-only kit. The main additions I suggest for a short-term situation or an emergency kit for your pack are a couple of medium treble hooks (again, multipurpose for trapping and fishing), a half-dozen larger barrel sinkers, and large single hooks in a plastic zip-lock bag contained inside the roll of bank line, held in by a couple of corks and a roll of #4 picture wire. The main use for the wire is for special traps such as squirrel poles where you need the rigidity of wire over bank line. It adds little weight and can be multi-use as a steel leader for limb sets and fishing if turtles are prevalent. Limb sets involve hanging a baited line from a limb with a hook on the end under water. For fishing, add a pocket fishing kit.

FISHING WITH IMPROVISED RODS AND TENKARA

Some of the best fishing rods are made from bamboo or river cane. These can be anywhere from 9' to 13' in length, and cutting them green will work fine. Lines for rods of this nature should be the same length as the rod. No

need to reel in the line—use the leverage of the rod to bring the fish within distance of the dip net or bank to secure the catch.

DISCOVER TENKARA

The fishing technique called "**tenkara**" is used in the mountains of Japan and has now started to spread rapidly to other parts of the world. It is based on the same concepts as cane pole fishing, with some adaptations. Tenkara is used mainly in rivers and streams, so it is a form of fly fishing and not far from dapping (lifting a lure/fly up and dropping it back down on the water's surface, jigging it on top the water). The brilliance of tenkara is the way lines and riggings are attached and detached from the rod. You can have several different rigged lines for different applications, which you can attach and detach from the rod within a few seconds without having to cut or tie a line to or from the rod. You do this by using what's called a lillian braid attached to the end of your rod. This can easily be fashioned from the mantle of any parachute cord or small-diameter cordage:

> Using a piece of para cord approximately 3" long, slide the end of the cord over the end of your rod as if it were a stocking.
> Leave about 2" of this overhanging and attach the first 1" permanently by wrapping the rod at that point with small-diameter string or line. Seal this with pine resin so it forms a bond to the rod.
> Tie a knot in the mantle at the very end and burn this nylon material a bit to create a sort of ball on the end. Once this is accomplished, your rod is now ready to accept any rigged lines.

RIGGING LINES

As stated earlier, with a tenkara pole you can keep multiple rigged lines to match fishing conditions and quickly change them out to adjust. You can

have floating fly lines, braided lines, and furled lines on different storage ladders rigged with different lures and hook combinations as well. Generally, carrying four different rigged lines will allow you to cover most scenarios. After you have chosen the type of line and rigging for that particular line (e.g., hooks, sinker, float or dry fly, and strike indicator), tie a simple loop in the top of the line using a figure 8 with a ½" loop. To attach the lines to your rod, create a lark's head loop in the line and place that over the ball knot you created on the lillian braid. At that point, it will self-tighten. It won't come off but will be easy to remove when you want to change lines.

BUSHCRAFT TIP

Line ladders are keepers to hold the rigged lines neatly and are not absolutely necessary. The lines can be coiled into a tin if you desire, but the ladders will keep them from getting knotted when removed for use. A ladder is simply a miniature of a ladder made from wood or plastic. They can be easily fashioned from a flat strip of wood carved into a half-moon shape on each end. The length is a matter of personal preference; I like mine about 4" long. Wrap the line around them to keep it neat for use and set up for that particular application.

PROCESSING SMALL GAME

Processing small game is faster and easier than processing a large animal and requires less energy to transfer the meat back to camp from the area of kill or capture. The main reason for concentrating on small game, though, is

that many times it can be consumed in one setting, leaving some leftovers for bait. To process and cook or preserve large game is a time-consuming and sometimes tedious undertaking. In areas where predatory animals are present, having large amounts of meat, blood, or carcasses in your camp area can be very dangerous. Processing small game is a very easy task for the most part and can be accomplished by anyone with minimal skill or practice.

SMALL MAMMALS

Many smaller mammals such as ground squirrels, mice, rats, and the like need no processing other than making a shallow slice to remove guts and anal tract. You can then place them in the fire to burn the fur off and cook the meat. Consume them whole to get all the nutrients from a small meal. Remember that any leftover meat should be used for baiting a trap to catch something else.

MEDIUM-SIZE MAMMALS

Medium-size critters are not that much more difficult to handle; you just need to remove the fur to make them easy to process, and quarter them for quicker cooking. Remove all innards and the anal tract. Be careful not to perforate the gut or intestines while removing them, as this can foul the taste of the meat. Many innards are worth consuming, such as the heart and liver. Check the organs of any kill to ensure that they look healthy: brightly colored with no blotching or worms. Again, remember to use leftovers for several traps or fishing.

PROCESSING OTHER GAME

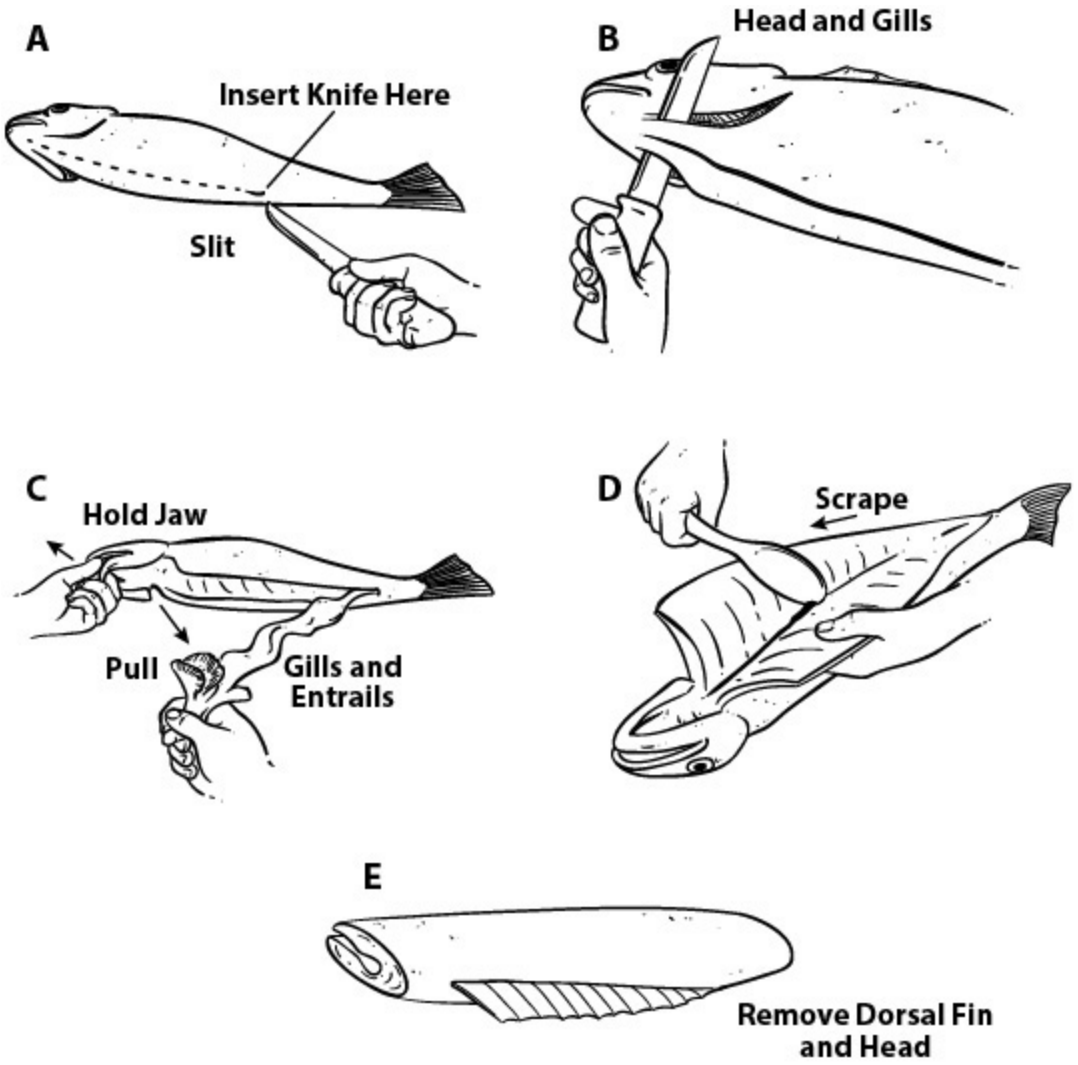
The eastern woodlands offer a wide variety of other game that can sustain you if you know how to trap and prepare it.

BIRDS

Removing or plucking the feathers in the wild can be a time-consuming process; you are better off skinning the bird as you would a mammal. The main thing to remember with birds is to empty the **crop**, a pouch at the base of the throat where food is held prior to digestion. This will usually contain dry seeds and such from recent feedings. Again, livers and hearts make great food, and all birds are edible. However, with scavenger birds such as buzzards, you should boil the meat well to ensure that any parasites are killed prior to consumption. Use your best judgment when examining the meat and organs for overall health.

FISH

Process fish by slitting them from the vent or anus to the base of the gills, removing all guts, and tearing out the gills. You can scale the fish or just cook it with the scales or skin on, and eat the meat from the inside out like a baked potato. If you choose to skin a catfish before eating, you will want a pair of pliers for scaling and skinning, as it can be tough. All freshwater fish in North America are edible.



How to clean fish

REPTILES AND AMPHIBIANS

Reptiles such as snakes can be skinned and the guts removed, then cooked like any other food. Remove the head of any poisonous snake prior to processing. Frogs can also be skinned or just cooked and consumed after gutting. Turtles are a bit tricky: Cut the head off, hang the body upside down to bleed out, remove the lower shell by cutting the thin layer of membrane between the shell and the meat, and clean out the innards. You can use the shell as a pot in which to cook the meat. Turtle meat makes very good bait for fishing.

PRESERVING MEAT

Since ancient times humans have preserved meat for later use. There are many ways of doing this. Here are a few simple ways you can preserve with little to no excess gear or additional resources.

DRYING

Drying removes moisture from the meat and makes it available for consumption later on a trip or on the trail. The key is to cut the meat as thin as possible so that the process happens quickly. You can dry meat in several different ways depending on natural resources available to you.

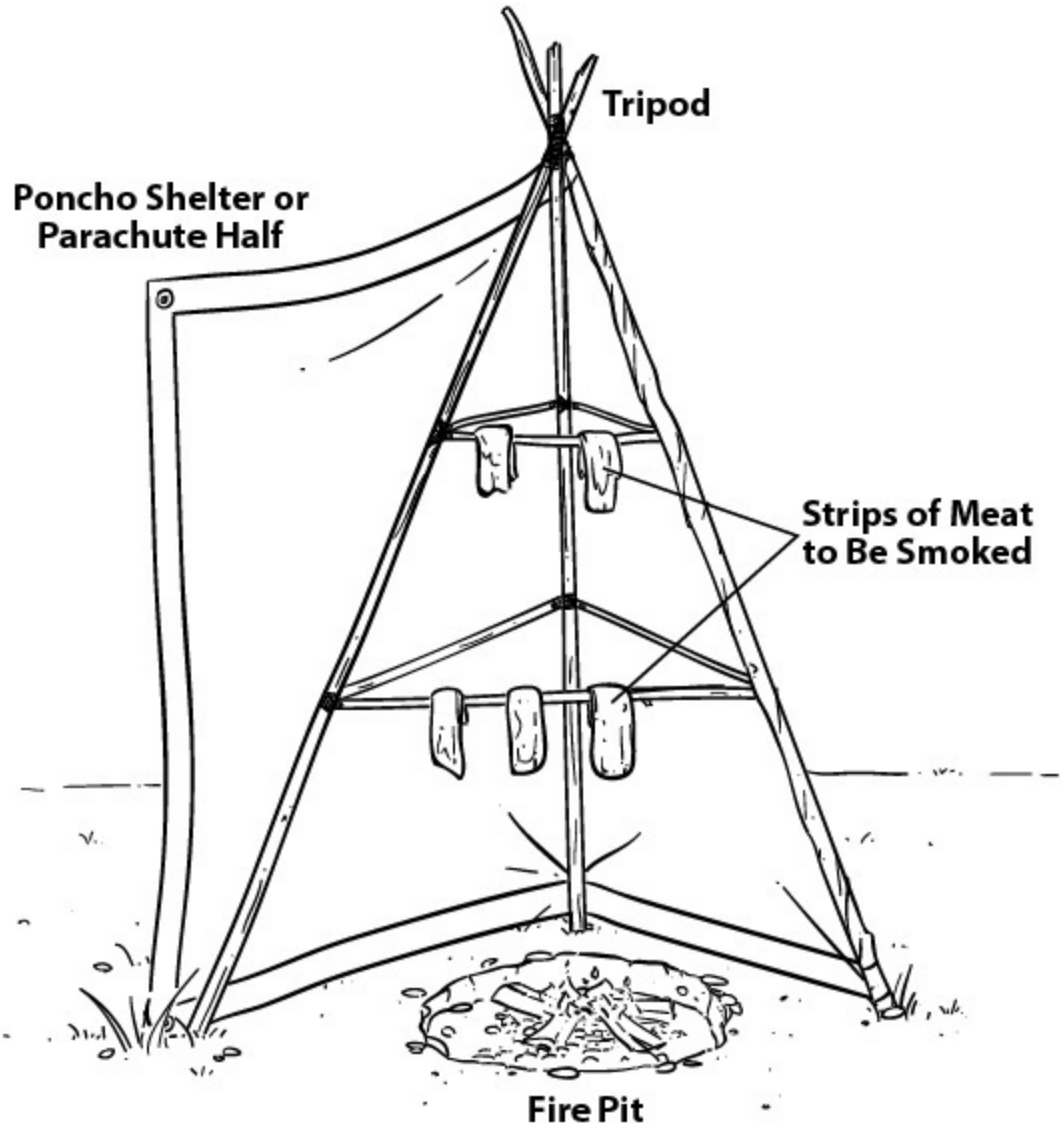
- Suspend the meat over a fire with low heat for a period of time until the meat cracks when bent, like jerky.
- Sun-dry the meat on a flat rock or rack. If a full hot sun is available, rotate the meat from side to side until dry.

The meat can also be smoked while drying to add flavor and additional bacteria-killing agents. Note that this is not the same process as smoking meat (discussed in the next section).

SMOKING

To smoke meat, you will need an enclosure of some sort made from available gear such as a poncho, trash bag, space blanket, etc. It can also be made from natural material. Build a tripod with a rack for smoking the meat approximately 2' above a hot bed of coals and small flame. The enclosure causes the smoke and heat to rise directly to the meat and accomplishes the smoking process. Unlike with drying, you are actually slow cooking the meat and not trying to remove all moisture. The smoke adds flavor as well

as antibacterial properties to the meat. You can use green wood to aid in smoke content, but stay away from resinous woods such as pines.



Smoking meat

TIPS AND TRICKS FOR SUCCESSFUL TRAPPING

Rotten and fishy meat attract scavenger-type animals.

Cats hunt more by sight than by smell, so hanging visuals above the set works best if you're trapping felines.

Canine predators will be more attracted to meat baits in the winter when other food is scarce.

Skunks that are shot then bagged in a drum liner can be used to contaminate other items with scent.

Skunk scent is one of the best long-distance call lures.

Beaver castor will attract almost *all* animals.

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Conclusion

I would like to thank you for reading this book. Of course, it's important that you not only absorb its lessons but also get outside and enjoy what nature has to offer. The best way to learn the skills we've discussed is to practice them.

It is important that we not forget the teachings of our forefathers and that we pass on these skills to those who wish to learn. While we are all bushcrafters and woodsmen at heart, we must also remember that we are stewards of the land. Conservation of resources and keeping things renewable and renewed should be a main goal on any outing. Only in this way will there be beautiful areas of the land for our children and their children to enjoy.

It's possible that when you venture into the wild something will go wrong. In that case, practicing these bushcrafting skills on shorter, easier tramps will help prepare you to better handle an emergency. Rather than face a life-and-death situation, you'll be able to turn it into a serious but not deadly problem, one that's capable of solution.

It has taken me years of research and experiment to discern which are the most valuable skills to own and which are the most important items to carry. This book is an attempt to sum that up in a short space and with a few illustrations. Volumes could be written on individual topics, but I also believe in the 80/20 rule of life: 80 percent of what you hear and see on a daily basis is the least valuable information. This book covers what I believe to be the 20 percent of bushcraft that is of the most value. It will not

only make you a better bushcrafter, but it will allow you to “smooth it” rather than rough it.

And in the end, that’s what counts. Good luck!

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Appendix A
THE PATHFINDER CONCEPT: CONSERVING AND UTILIZING RESOURCES

Conserving resources means many things. In the context of this book, it means the need to be frugal and make the greatest use possible of the resources you have. If you're stranded in the wild, you don't know how long it will be before you're found, so you must understand and conserve key resources. Here are some things to get you thinking.

TEN THINGS TO REMEMBER

Never use your knife unless you have to. Break sticks whenever possible, and strip bark by hand or with sharp rocks.

Never pass an opportunity to collect dry tinder for later use. Start fires with primitive methods if you have time and calories to burn, and save the sure flame for when you absolutely need it.

Never waste meat after securing it. Dry whatever you have left and store it in a bandanna for later consumption.

Make use of all parts of any animal. Bones can make tools and innards can be used for bait.

Use deadfall for shelters and fires whenever possible to avoid wasting energy breaking and cutting materials.

Water can be precious. Whenever rain is imminent, set up a collection device.

Do not travel unnecessarily to secure game. Run traps in a daisy pattern around your base camp instead of a line.

Set up your camp near water when possible. This makes collection of water and securing food more accessible and requires less travel.

Always think about the next fire and plan it by making char cloth or sparing some tinder.

Travel during times of easy comfort. In hot weather, travel in the mornings and evenings, and in cold weather travel during times of high sun.

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Appendix B
WILD EDIBLES AND MEDICINAL PLANTS

Too many people get wrapped up in identifying wild edibles and what they can and cannot eat. Again, keep it simple. Look around your yard; there are probably several very common wild edible plants. Instead of worrying about the plants that are few and far between, concentrate on the common ones. Pick eight, then commit them to memory. On a recent trip to New Zealand, I was astonished to see that many of the same plants that are in the United States are also thriving there; dandelions, clover, plantains, cattails, etc., were all growing just as they do here. Chances are, if you spend much time in the wild, you'll become lost or stranded at least once, so concentrate on common plants. If you can identify eight edible plants, at least a few will be common in other areas of the United States, as well as abroad. You can do yourself a great service by learning families of plants so that you can identify edibles by similarity. However, be aware that many plants have poison look-alikes. **Warning:** Never eat wild mushrooms or any other fungi. Fully identify any plant before consuming it.

There are four groups of edibles that provide good nutritional value but not fat. You should memorize at least two in each group and learn to recognize the tree or plant in all seasons.

Starches, Roots, and Tubers

Fruits and Berries

Nuts

Greens

The following is a list of some common edibles from these categories:

EDIBLES	CATEGORIES
Cattail	Roots/Tubers
Parsnip	Root (Warning: This plant's leaves and stem may cause contact dermatitis.)
Dandelion	Greens
Burdock	Greens/Roots
Hickory	Nut
Walnut	Nut
Raspberry/Blackberry/Salmon Berry	Fruit
Common Elderberry	Fruit

- **Cattails** are nature's supermarket and pharmacy. The young shoots are edible raw or boiled; the root stock tubers can be boiled and eaten as well. The pollen collected from the seed heads can be used as flour, and the young seed heads can be eaten like corn on the cob.
- **Field parsnip** was used as a staple food for centuries, but is now forgotten by most; the root of this plant is a great starch and can be baked like a potato. Warning: Contact dermatitis can occur when handling this plant.
- **Dandelions** are a great green for a salad or can be eaten on the fly; they are full of vitamin A and the flower tops are edible as well. Dandelion root is a good coffee substitute when dried and ground.
- Young leaves of the **burdock plant** are especially good for salad greens, and the large taproot is fine starch.

- **Hickory nuts** can provide protein to your diet if you break them open and dig the nut meat from the inside.
- **Black walnuts** are a great source of protein and are not difficult to process. The hulls are useful for making a brown dye, and they have a chemical compound that when ground can be used to stun fish in small pools.
- **Raspberries** are very common summer fruits of the eastern woodlands. Other forms, such as salmon berries and blackberries, are common in other regions. These are a great source of fruit and vitamins and can be used in many meal applications and teas as well as eaten raw. Grapes are also common, although they have many poisonous look-alikes. The young shoots of these plants are also edible when fruit is not bearing, and the leaves make a good tea.
- **Common elderberry** fruits are very common from summer to fall. You can eat them raw as well as boil them to make a nice drink, or combine them with other foods to make a wonderful meal.

MEDICINAL PLANTS

Medicinal plants are also common, and many of them grow on roadsides and in yards all over the United States. Again, you should identify a few common ones that will help when used as simple remedies for common ailments, e.g., cold, upset stomach, headache, bites and stings, and allergic reactions (contact dermatitis). Plants that aid in hygiene are also worth understanding.

The following is a list of some more common medicinal plants:

PLANT	MEDICINAL BENEFIT
Cattail	antiseptic, tooth and gum care
Mullein	cold/congestion, female cycle needs
Jewelweed	contact dermatitis
Plantain	bites/stings
Mint	headache
Mint and Dandelion	upset stomach
Yarrow	blood coagulant/cold and flu/insect repellent
Boneset	deep bruises, breaks, fevers

- **Charcoal**: This isn't, of course, a plant, but I mention it in this section as it can be an indispensable resource in the case of accidental food or plant poisoning. Ground in water, it will immediately induce vomiting and has absorbent qualities to remove leftover toxins from the stomach.
- **Cattail** has a very good gel that is present at the base of the sheath when the shoots are pulled out. This gel is anesthetic and antiseptic; you can liken it to aloe, as it is great for local pain relief from burns or stings. The young shoots of this plant make great toothbrushes as well.
- **Mullein** has been used for centuries as a decongestant and is great for cough and cold remedies; the large soft leaves of this plant can be used as wound dressings and are absorbent for female needs.
- **Jewelweed** plant has chemicals within its juices that help alleviate the symptoms of contact dermatitis from poison ivy and other plants. The freshly picked plant can be rubbed on the skin. It is important to use this plant as soon as possible after contact from a problem plant.
- **Plantain** can be used as a poultice by chewing the plant and then placing the macerated leaves on a sting or bite. It helps to draw out foreign objects such as splinters and thorns as well as the poison from a sting.

- **Mint** has many excellent properties for general and medical use. Fresh mint leaves rubbed on the temples will help ease minor headaches. Dried mint and dandelion infusions are good for an upset stomach and will help relieve diarrhea. A decoction of mint can also be gargled for sore throats, and an infusion or tea can be made with mint and yarrow to relieve cold and flu symptoms.
- **Yarrow** has been known throughout history for its abilities to clot blood from deep wounds; it also has anti-inflammatory properties. It will induce sweating when consumed as a tea and helps to break fevers. Recent studies have also shown that it's a great insect repellent.
- **Boneset** as an infusion will help break a fever, while a poultice of the green leaves will help with deep bruises and even bone repair.

USING MEDICINAL PLANTS

Medicinal plants are mostly used in four ways:

Poultice: By gathering the plant leaves and flowers raw and macerating them, you can form a poultice. This can then be steeped in boiled water or even chewed in the mouth (spit poultice) if it's an emergency, and then placed directly on the affected area and wrapped with a bandanna or bandaging.

Infusion tea: To make a tea or an infusion, steep as you would a poultice for approximately 10–15 minutes, and then consume the liquid after straining.

Decoction: A decoction is much like an infusion but requires the material to be boiled, not steeped. This method is used for any bark material or roots. The liquid is then strained and consumed after boiling half the liquid away.

Wash: A wash is an infusion used to clean the affected area, instead of ingestion.

PLANT/TREE AFFILIATION BY TASTE

If you know a plant is not poisonous, you can understand much about the properties by actually tasting it. Put it in your mouth, chew it up, roll it around; feel what it is doing on the palate and how it tastes. Based on taste, you'll be able to divide it into one of four categories:

- **Bitters:** Plants that have a bitter or acrid taste are generally good medicine for colds and flu. They will generally be both antiseptic and antiviral in nature.
- **Mucilaginous:** Plants that make the mouth water or are slimy will be good for constipation, as they will "grease the pipes," so to speak. They will be good for dry irritated sinuses, as well as burns.
- **Astringents:** Plants that are astringent will pucker your mouth or dry out your palate and will do the same thing in the body or on the skin. They will dry poison ivy, help dry up diarrhea, and cure a runny nose.
- **Carminatives:** These plants will feel warming or spicy, and will be great for stomach upset and general relief of gas and discomfort in the digestive tract.

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Appendix C
BUSH RECIPES

HARDTACK

4–5 cups all-purpose flour

2 cups water

3 teaspoons salt

Preheat the oven to 375°F (or 350°F if you have a convection oven or reflector oven).

Mix the flour, water, and salt together in a large bowl, and make sure the mixture is fairly dry. Add more flour if necessary.

Roll the mixture out to about ½" thickness, and shape it into a rectangle. Cut it into 3" × 3" squares, and poke holes in both sides with a fork or knife.

Place on an ungreased pan and cook for 30 minutes per side.

BASIC BANNOCK

1 cup flour (white or a mixture of white and whole-wheat)

1 teaspoon baking powder

¼ teaspoon salt

¼ cup dry milk powder

1 tablespoon shortening

Oil, for frying
Water, as needed

Make the mix at home ahead of time. Sift the dry ingredients together into a large bowl, and cut the shortening in until you have a granular, cornmeal-like mixture. Package this mix in zip-lock freezer bags. Double-bag it if you're going to be on a long trip.
Start with a small cast-iron or stainless steel frying pan and oil it well. You can also use a hardwood plank.
Pour approximately ¼ cup water into the bag and squeeze to mix.
Squeeze the mix out of the bag and into the warmed pan or onto a plank.
Your bannock will start to look loaf-like in 10–12 minutes, depending on the heat level from the burner. At this point you'll want to flip your loaf. To check for the finished product, take a toothpick and poke the loaf. If it comes out dry, it is done; if it comes out moist or with goo on it, let it cook some more.

SQUIRREL OR RABBIT ROAST

1 adult squirrel or rabbit
All-purpose flour, enough to dust the meat
Oil, for frying
Water, for roasting
1–2 potatoes, peeled and quartered
3–4 carrots, peeled and chopped
1 onion, peeled and quartered
Salt and pepper, to taste

Clean the meat well, making sure that all hair is removed. Cut into pieces.

Roll the pieces in flour and brown in the skillet (use just enough oil to keep the meat from sticking). Just brown the pieces; it is not necessary to cook the meat through.

When browned, add water to cover. Place quartered potatoes, chopped carrots, quartered onion, and salt and pepper to taste in the pot with the meat. Place the lid on the pot and cook over medium-low heat until done, approximately 30 minutes, depending on the heat of the fire.

FROG LEGS

12 frog legs
2 cups saltine cracker crumbs or ground hardtack
1 cup all-purpose flour
1 cup cornmeal
⅛–¼ cup diced onion
Salt and pepper, to taste
1 large egg
½ cup evaporated milk
Cooking oil or tallow, for frying

Rinse the frog legs and pat dry; set aside. In a large resealable bag, combine saltine cracker crumbs or ground hardtack, flour, cornmeal, onion, salt, and pepper. Shake to mix. In a shallow bowl, whisk together egg and evaporated milk.

Heat cooking oil or tallow in skillet over medium-high heat. The oil should be about ½" deep.

Dip the frog legs into the milk and egg mixture, then dip into the cracker mixture until evenly coated. Carefully place them in the hot oil. Cook until golden brown on each side, about 5 minutes per side. If the legs start to brown too quickly, reduce the heat to medium. Drain before serving.

BOILED BEAVER

1 hind quarter of beaver
1 large onion
3 carrots, sliced
2 teaspoons salt

Boil beaver in water in a large soup pot for 30 minutes. Drain and rinse. Repeat this method two more times.
Cover with water again, then add the remaining ingredients. Cover and boil until tender. Dispose of vegetables before serving, as they will hold most of the wild taste from the beaver.

MUSKRAT SOUP

Hind quarter of a muskrat
1–2 cups evaporated milk
3 boiled large eggs
1 tablespoon dried garlic mustard
1 tablespoon all-purpose flour
Black pepper, cayenne pepper, and salt, to taste

Cover the prepared muskrat (musk removed and thoroughly washed) with water in a large soup pot. Cook slowly until tender,

adding water if needed, approximately 30 minutes, depending on the heat of the fire and the size of the quarters.

Cool, and take meat from bones. Cut meat into small pieces with a knife.

Save the pot liquor and add an equal quantity of evaporated milk.

Mash egg yolks; add garlic mustard and flour, and stir into the liquid. Season to taste with black and cayenne pepper and salt, and return to a boil.

Chop the egg whites. Add the meat and egg whites to soup after it has boiled. Serve very hot.

RACCOON STEW

1 (4-pound) raccoon, cut into cubes
2 or 3 wild-picked onions, sliced
Salt and pepper, to taste
6–12 ground leaves garlic mustard, or to taste
Dash of hot sauce
Cubed potatoes and vegetables of your choice, to taste

Brown the meat cubes slowly in a Dutch oven, approximately 20 minutes. There should be enough fat within the tissues that no additional oil is required.

Add onions during the last of the browning process so they won’t become scorched. Reduce the heat, season with salt, pepper, garlic mustard, and hot sauce, and cover. Simmer over low heat until almost completely tender, about 45 minutes.

Add cubed vegetables of your choice and continue to simmer until vegetables are tender. Serve hot with Basic Bannock.

BAKED DOVE BREASTS

12–24 dove breasts (approximately 1 pound)
Salt and pepper, to taste
2 cups all-purpose flour
Lard or tallow, for frying
¼ pound fresh mushrooms (morels), sliced
6 medium wild onions, sliced
1 cube chicken bouillon dissolved into 1 cup boiling water
Prepared brown rice, to taste

Preheat the oven to 350°F. Salt and pepper the dove breasts, and lightly flour. Brown in a cast-iron skillet with lard or tallow. Place sliced mushrooms and onions on top of breasts. Top with the bouillon broth. Cover the skillet with aluminum foil. Bake for 25 minutes. Uncover and continue baking for 15 minutes longer. Serve with brown rice.

SNAPPING TURTLE IN A POT

Salt, to taste
1–2 pounds turtle meat
2 teaspoons diced onions
⅛ teaspoon dried onion garlic
2 cups water
8 small unpeeled red-skinned potatoes, halved

Salt turtle meat well and place in your slow-cooking cast-iron pot. Add all other ingredients in the order given. Cover and cook on low heat for 6–7 hours or until turtle meat is tender.

Remove turtle meat from pot and cut into bite-size pieces. Return meat to slow-cooking pot, cover, and continue to cook on low heat for an additional 2 hours or until vegetables are done.

JERKY (ALL RED MEAT AND FISH)

3 pounds meat, lean cuts
Spices of your choice (salt, pepper, etc.)

Thinly slice the meat (as thin as possible; it will dry faster). Coat with ample seasoning by placing in a freezer bag and shaking. Build a drying rack on your tripod and hang meat over a hardwood smoldering fire so that you can comfortably hold your hand in place over the rack for 3–5 seconds. Cover with a space blanket to make this process go faster and to create a smoking chamber as well. Slowly feed the fire, avoiding large flames, until meat is dry enough to crack when it is bent. Store in a breathable bag for the trail. Rehydrate in soups for added meat value.

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Appendix D
GLOSSARY

A-frame shelter
A shelter with two walls meeting at the top, which can deflect wind or rain from two sides.

aim off
In navigation, to take a bearing to the left or right of the intended destination by a few degrees so that you know, upon arrival at the bearing, to turn either right or left to get where you're going.

azimuth
A bearing, or the direction in which you are traveling; the angle of deviation of a bearing from a standard direction, such as north or south.

backstop
In navigation, a point beyond which you shouldn't go. Generally, a linear feature that runs perpendicular to your route to your intended destination.

bail stick
A form of pot hanger with multiple adjustment points so you can raise or lower the pot above the fire.

bank line
Tarred nylon used for fishing and net-making. It is a good survival cord as it is rot- and UV-resistant as well.

baseline
The opposite of backstops, baselines run perpendicular to your point of departure and provide a means of getting back to where you started from.

baseplate compass
A compass made from a flat plate that is usually transparent and can be laid on a map to determine accurate bearings.

batoning
A means of splitting wood by using a stick (or “baton”) to strike your knife and drive it through a piece of wood such as a log.

bearing
In navigation, direction.

bezel ring
A movable ring on a compass indicating directions marked in degrees. It is used in orienting.

binding
Made of cordage, bindings are used to keep objects from coming apart or separating. For example, a binding on the end of a rope keeps the strands from fraying.

bird’s nest

Used in fire-starting, this is a bundle of tinder shaped roughly like a bird’s nest. It should be a combination of fine, medium, and coarse highly combustible materials.

bivvy bag
A plastic bag that covers the camper’s head and sleeping bag to provide protection against wet weather or damp ground. Derived from the word “bivouac.”

blood circle, the
In knife handling, the area 360° around you, farther than arm’s length, where someone could come into contact with a blade being pushed away from the material being cut.

bow drill
A fire-making method that uses a bow to move a stick rapidly, generating friction and heat that can ignite tinder.

browse bag
A lightweight bag sewn up one side and across one end. It can be filled with material to make a mattress.

burner
The unit in a camp stove that produces the flame.

cable snare
In trapping, a snare trap made from steel cable.

canvas
Material used mainly for tarps and tarp tents. It is waterproof, usually fireproof, and mildew resistant.

charring tin
A tin box containing charred material to help in fire-making.

Conibear
A very effective trap for small animals and fish.

cranes
Made with a notched stick and a forked stick, cranes can be used to suspend pots over the fire or to hold anything else you want to suspend above ground level.

Dakota fire pits
A type of fire lay in which two holes are connected and a fire is built in one of them. The air circulating from the other hole keeps the fire burning hot and bright.

deadfall
Wood that has naturally fallen—dead branches, trees blown over, and so on.

deadfall traps
A trap that depends on the animal setting off a trigger that releases an object that falls on the animal, killing or trapping it.

debris hut
A shelter in which three corners are anchored to the ground, with one side mounted on a ridgepole, creating a triangular structure, which is then covered with leaves and other debris.

declination diagram

A diagram on a map that shows the amount of degree offset left or right between magnetic north and map north.

decoction
A drink made from material such as roots or bark, which is boiled, then drunk.

diamond board/diamond rod
A device for sharpening knives and other edged tools.

diamond shelter (plow point shelter)
Similar to a debris hut, this shelter is anchored by three corners to the ground, while the fourth corner is fastened to a tree or some other structure, thereby creating a diamond shape.

draw
The reduction in elevation from a saddle with high ground on both sides.

fatwood, pitch wood, lighter pine
The resinous area of the pine tree in which sap collects naturally. Excellent as fire-starting material.

feather sticks
Sticks that are cut to create bunches of shavings on one end. The additional surface area this creates makes feather sticks useful for starting fires.

fell
To cut wood, especially trees. Felling a tree is not a decision that should be taken lightly.

ferrocerium rod
A rod made from pyrophoric materials and used to start fires by striking it against a hard surface, which produces sparks.

fire lay
Wood laid in a particular pattern for the purpose of starting a fire.

flash tinders
Plant materials that contain volatile oils, which will readily combust. However, because of the fine fibers involved, they will burn very quickly and the flame is short lasting.

flying the tarp
A method of setting up a tarp in which none of it touches the ground.

ground cloth/ground pad
A cloth or blanket you can lay on the ground to protect yourself against damp and cold.

hammock
A bed you can swing between two supports off the ground. It keeps off creatures and prevents the loss of body heat through conduction.

handrails
Linear objects within the terrain that you can use as a guideline to follow when they lead in the intended direction of travel.

haversack
A small bag you carry on one side of your body. Used for items that are likely to be of immediate importance.

hemp
The tough fiber of the Indian hemp plant, used for making cordage.

jackknife
A pocketknife in which the blade and other implements fold into the handle.

juglone
A poison that prevents or stunts the growth of many plants. It can also be used in a concentration for a fish-stunning potion.

keyhole fire
A fire pit dug in the shape of a keyhole. The fire is built in the “hole” and hot coals are dragged into the trench to form a cooking area.

kindling
Material that can be easily ignited to start a fire.

knife grind
The shape of the cross section of a knife blade. Different grinds require you to hold your whetstone at different angles when sharpening the blade.

kuksa
A cup (also known as a noggin) made of wood or plastic. It can be used for drinking or cookery.

lashing
Knots used to fasten several objects together. They’re essential in constructing sturdy shelters in the wild.

lateral drift
The tendency, when walking long distances, to gradually move left or right.

lean-to shelter
A shelter made from a single wall propped up at an angle and covered with leaves, branches, and other debris to form a secure roof.

log cabin fire
A fire lay made by laying logs crosswise in a square with kindling and tinder inside.

L.U.R.D.
Left, up, right, down. A method of navigating based on the apparent movement of the stars due to the earth's rotation.

magnifying glass
A lens used for close examination of anything as well as a reliable firestarter in the wilderness.

map scale
An indicator of the correspondence between measurement on a map and real distance. For example, some maps may indicate that one map inch equals one mile of distance.

military Modular Sleep System (MSS)
A set of sleeping bags—one intermediate weight and one lightweight—and a bivvy cover, that provide sleep protection in most environments.

mule tape
A tape much used by electricians, which has a very high tensile strength and is lightweight.

notching
Carving notches in a branch or pole, either for construction or to create hangers and handles.

oilcloth
A waterproof cloth used for tarps and tents, made of cotton coated with mineral spirits and linseed oil.

pace beads
Strands of beads used to keep track of distance while walking. You drop a bead on the strand after walking a given number of paces.

pan tension
The amount of tension required to move the pan of a trap down and spring the trap.

parachute cord
A cord that has a woven outer covering (the mantle) that protects the inner strands that give the cord its strength.

PAUL method
Standing for Positive Azimuth Uniform Layout, this method will allow you to scout an unknown area and figure a straight line bearing back to camp without backtracking by reverse azimuths all the way.

pitch a camp; strike a camp
Set up a camp; take down a camp.

pitching the tarp
To stake any part of a tarp at ground level.

planks
Slabs of wood crosscut from a larger piece and used as a cooking surface for foods such as breads and bannocks.

polypropylene
A lightweight material that can be purchased very inexpensively; however, its longevity and durability make it unsuitable for anything other than the short term.

poultice
A soft, moist mass that’s applied to the body as a bandage or a remedy for illness.

resection
Taking a bearing using triangulation to determine your location.

resin
The sap of a pine tree. It has various uses, including as a firestarter, bandage for a wound, and various medicinal purposes.

ridgeline
A series of hilltops, offering an observation point and high-ground travel.

Roycroft frame
A frame for carrying your pack. It consists of three sticks lashed together to form a triangle.

rucksack
Another name for a backpack. This is the basic bag in which you carry most of the items you'll need while in the wilderness.

saddle
A lower-lying area between two hilltops that forms a drainage point for the hilltops as well as protection from wind and rain.

shear cut
A cut made with the intention of shearing off wood from a larger piece.

sheath
A case or covering for a bladed tool.

silnylon
Nylon impregnated with silicon, making it waterproof.

sleeping bag
Any of a number of padded bags made for sleeping. They can be insulated with feathers, down, artificial insulation, or air space, among other things.

strop
A device, often a leather strap, for putting a fine edge on a blade.

tannin
An astringent derived from the oak tree. It can be used to make poultices, infusions, and dyes.

tarp

Short for tarpaulin; a canvas or oilskin covering, used to erect shelters and for other purposes in the wild.

teepee fire
A fire lay in which kindling is stood on end with the tips touching, looking like a teepee.

tinder, tinder bundles
Highly combustible material that can readily take a spark or easily catch fire when a smoldering ember is added.

toggle
A wood stick or dowel connected to a line by a knot. This can be used as an attachment point that is easily moved or removed, and will be load bearing if needed.

tomahawk
An axe with a slender, straight handle that can be easily removed, making it a hand tool that can be used for other tasks.

Trangia stoves
A stove in which an enclosed material wick (usually asbestos) is sealed in a confined space with holes at the bottom of the container for alcohol to wick in.

triangle of death, the
The part of your body that should always be shielded from a knife or axe. It comprises the space between your upper legs, including the groin and both femoral arteries.

tubular webbing

Webbing used primarily for climbing. It weighs less than rope, takes up less space, and generally has higher tensile strength.

tumplines
Straps for a pack or frame that are worn across the forehead to assist in carrying heavier loads.

upland trapping
Setting traps above the water on higher ground for animals such as coyote, fox, raccoon, opossum, and other small land animals.

Venturi effect
The tendency of air entering a narrowing tube to flow faster. This can have a significant effect on a fire.

whetstone
A stone used for sharpening or honing a bladed tool.

widowmakers
Standing dead trees that may easily fall or break if subjected to wind. These could cause serious safety issues.

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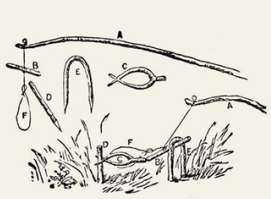
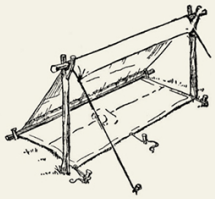

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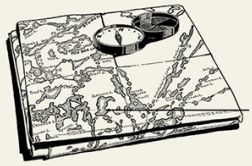
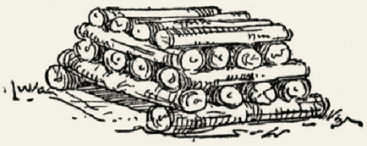

DAVE CANTERBURY
New York Times Bestselling Author of *Bushcraft 101*

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ADVANCED
BUSHCRAFT

An Expert Field Guide to the Art of
WILDERNESS SURVIVAL

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Avon, Massachusetts

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DEDICATION

A book should be dedicated not only to those from whom the knowledge to write it was secured but also for those who make it possible. My wife Iris has made it possible for me to live my dream of teaching outdoor skills to others through many outlets from social media to television as well as the written word. She has faithfully stood by me through the countless hours of training and evolving, through the years of practice and experimental dirt time. She has always supported me and given of herself to help fulfill my dreams in this and any endeavor, and so to her I dedicate this book. I would also like to thank my father for the examples in work ethic he taught me my entire life and still to this day. While we strive to chase our dreams in life we must always remember the road to success is paved by the work you put into it. I have learned this lesson well from his teachings.

As for the contents of this book, the list is exhaustive to say the least: men forgotten in history of both American and European descent, native peoples of the early Americas who passed their knowledge to us along the way in the early days of exploration, and many modern role models who continue to this day to pass on the knowledge they have in an effort to establish these lessons for generations to come. The writings of authors past such as Daniel Beard, Ernest Thompson Seton, Hyatt Verrill, William Hamilton Gibson, George Washington Sears, Horace Kephart, Mors Kochanski, and many others come to mind quickly as shining examples of men from whom I have taken a wealth of knowledge to further my learning.

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Introduction

This is the second in what I hope will eventually be a series of books on the art of bushcraft, or wilderness survival. *Bushcraft 101* was a primer on the skills necessary for a short stay in the wilderness. These skills include building an effective kit, selecting and managing equipment, developing supplies, and setting up camp. Much of our study was on connecting with nature and learning the basics for preparing ourselves for any climate and situation. In *Bushcraft 101* we learned that many things can be accomplished with our own knowledge and a few tools. We talked about the kinds of things you need for a short stay outdoors. In *Advanced Bushcraft*, we will take these skills to the next level and prepare you for a lengthy stay in the wilderness.

The most important thing to understand before embarking on a long journey outdoors is resource management. You can only carry so much on your back—especially if you plan to hike or walk for a long distance. Since you cannot bring a truckload of supplies with you, you need to understand the limitations of your kit and how to maximize the environment and its resources to overcome these limitations. You must discern between which supplies you should carry with you and which can be harvested or manufactured on the trail. This requires keen competency in manufacturing versatile tools, starting fires with minimal forms of ignition, developing semipermanent shelter, and establishing an effective trapping campaign for food.

Long-term sustainability will require a lot of improvisation. Part of self-reliance is learning to deal with the unexpected. Tools will break, weather will turn, and food sources may be hard to find. You need to be confident enough in your skills that you can fix the handle on your axe if it breaks, and, when you do find that game, preserve the leftovers so the meat will last you a good while. If you understand advanced skills such as building watercraft and making containers for water and other supplies, you will be able to negotiate the climate and your environment for a long time. Don't underestimate the value of comfort. If you are going to be out for a long time, a good night's sleep is critical. Knowing how to assemble a sleep system by fashioning pillows and building raised beds will make a tremendous difference in your ability to be successful.

We will also take a close look at advanced wilderness skills such as weaving for additional clothing and shelter implements and net making to help secure fish and other water animals as additional sources of protein. Managing cordage and manufacturing additional rope out of natural materials will be a critical component of these practices.

Understanding the natural world will be absolutely essential to your ability to smooth it in the wilderness. It is your repository for food, fire-making supplies, and health resources, and it furnishes you a place and the materials to build your shelter. Being able to recognize the components of a tree, from the properties of its wood to the medicinal values of its outer leaves and bark, will allow you to take advantage of your environment's largest resource. Recognizing animals and their behavioral patterns is what will help you outthink them when you're hunting. Even the clouds in the sky can provide you with a weather forecast, which you can use to make adjustments to your camp and shelter. Remember to practice! Use short camping trips as an opportunity to hone these skills and experiment with

life when you are carrying only a few things. If certain things don't work out right away, that's okay! Head home, rest up, and try it again on your next trip.

This handbook is intended for the woodsman who knows basic primitive survival skills and is looking to advance his knowledge and abilities for a longer stay in the wilderness—a few days or even an entire trapping campaign season. These skills will also help you in the event you become lost or stranded without resources. Mostly, though, these give you a chance to envelop yourself in nature as our ancestors before us did. As George Washington Sears (Nessmuk) wrote, "We seek the forest for adventure and a free, open-air hunter's life, for a time at least." *Advanced Bushcraft* is the handbook for your adventure. Use it to survive and thrive in the natural world.

—Dave Canterbury

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Chapter 1
BUILDING YOUR KIT

"The doctorate in woodsy knowledge can only be taught by Mother Nature in the classroom of the outdoors. Many can train you but only experience can teach you."

—DAVE CANTERBURY

Bushcraft is the practice of using wilderness skills to survive and thrive in the natural world. In *Advanced Bushcraft*, you will hone those skills and push beyond the mentality of immediate needs. You will learn to think about the totality of your skills and supplies and how they work together to ensure long-term sustainability. In other words, it's not just about packing resources. It's about thinking ahead to the kinds of skills it takes to refurbish your resources or create more if necessary. You will learn that it takes a lot of skills but only a few tools to become self-reliant. With just a handful of the right implements you can manufacture most of the things you need, from a permanent shelter to clothing, hunting gear, weapons, and even medicine.

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PLAN THE SCOPE OF YOUR TRIP

Short-term trips in the woods are great opportunities to practice skills and take chances with a smaller kit. Traveling with fewer implements requires a lot of improvisation with tools and supplies, and it's okay if things do not go perfectly. On a short jaunt, whether it is a day or a week, it does not matter much if your shelter is uncomfortable or if your trapping campaign is not overly successful. Use short-term trips as opportunities for learning and know that if something does not turn out quite right, you can practice again next time to make it better.

A long trip, say a full-season trapping campaign, requires a lot of confidence and certainty in your skills. You do not want to place yourself in a situation of unnecessary risk. For long excursions, a good 4–6 hours of restful sleep each night becomes an imperative component of safety. With that in mind, the comfort level of your shelter and sleeping implements matters a great deal. You might need to bring supplies to trap for food, but you should also plan for a possible unsuccessful trapping campaign by bringing backup food sources. You also need to think about ways to conserve the most valuable resources or make sure that you are not overusing them. It may not be possible to replace a broken knife on the trail.

On a long-term trip, you might also need to include some type of conveyance. Since these are cumbersome, you need to maximize it as a resource. For example, a sled for dragging supplies in the snow can be repurposed to drag firewood or animals from your traps back to camp. Conveyances are not often discussed in bushcraft literature, but they are critical to long-term sustainability. Our ancestors never took to the woods or wilderness without horses, wagons, canoes, sleds, or pack trains.

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TEN Cs OF SURVIVABILITY

As discussed in *Bushcraft 101*, the most basic kit items are based on the Five Cs of Survivability. For longer-term stays in the wilderness you can expand that checklist to Ten Cs:

- **Cutting tools**: knives, axes, saws
- **Combustion devices**: ferrocerium rod, lighter, magnifying lens
- **Cover elements**: seasonal clothing with outerwear, tarps, wool blankets, sleeping bag, emergency bivvy, hammock, small tent
- **Containers**: water bottles, canteens, nesting cook pots and pans
- **Cordage**: bankline, paracord, rope, webbing, mule tape
- **Cotton materials**: bandannas, shemagh, netting, cloth shards
- **Cargo tape**: duct tape (I prefer the Gorilla Tape brand)
- **Candling devices**: headlamps, candles, crank lights
- **Compasses:** your preferred brand along with a small backup like a quality button-style
- **Canvas repair needle**: wedge-style needle for repairing heavy materials

Do not forget to include any medications, including something to relieve an allergic reaction, and first-aid kit items.

Now let’s break the kit down into categories so that you can really consider your needs.

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CORE TEMPERATURE CONTROL

This is the first and most important kit category. Clothing is the most basic way to control temperature. Here are some more specific guidelines:

CLOTHING

Pack at least two full sets of socks and undergarments, trousers, and shirts. Carry clothing that is comfortable in all seasons or be prepared to pack enough clothing for two different climates (for a total of four sets). I would recommend 10–12-ounce durable canvas pants like the tree-climbing pants offered by Arborwear. Long-sleeved, lightweight, canvas, button-down shirts are comfortable in all seasons, and cotton T-shirts take advantage of evaporative cooling in the summer. Do not forget to plan for rain and wet weather. Tentsmiths makes a solid raincoat from cotton treated with an oil/wax finish.

In winter, use a heavy wool layer that will act as insulation, such as the **merino wool pants** offered by Minus33. In general, nothing beats wool in cold-weather climates. It is comfortable, fire retardant, repels moisture, and even when it is wet it still acts as a good insulation. I prefer the Boreal Shirt by Lester River Bushcraft. It has never let me down, even on the coldest of winter days and nights here in the eastern woodlands. If freezing rain and sleet are an issue, combine the wool with an oilcloth raincoat.

FOOTWEAR

Leather boots are an absolute must for long-term wilderness activities. The Pronghorn, from Danner, is a great three-season boot, and their Canadian model works well in the winter. When choosing your footwear, remember that boots are only as waterproof as they are high. Carrying a second pair of boots will save a lot of trouble on long-term trips so you can

alternate and avoid wearing them out too quickly. If carrying a second pair is too cumbersome, at least plan to bring a pair of **moccasins** to wear when walking around camp so that you give your boots an occasional rest. Moccasins, elk hide or buffalo, are also handy when stalking game in dry leaves.

HAT

Never underestimate the importance of **hats** when planning your kit. A good hat will protect you from the sun and conserve body heat—most of which is released through the head and the neck. A felted wide-brim hat works well in spring, summer, and fall. A wool beanie or toboggan will help combat the cold in winter. In the most severe weather I have found great comfort in the old leather bomber caps with earflaps and fur linings.

SCARVES

Kerchiefs and **scarves** have been staples of the woodsman's kit for hundreds of years. Their uses go well beyond the obvious. The cotton netting used as a sniper veil works very well in summer and makes a great improvised net for fishing. Kerchiefs made from cotton, like the shemagh, are effective across three seasons. In winter, I prefer a 4' × 4' scarf, which not only keeps me warm but can also be used as a cape to repel snow.

GLOVES AND MITTENS

A sturdy pair of **leather calfskin gloves** will protect the hands from briars, brambles, and blisters when doing normal camp chores. In winter, arctic mittens with wool glove liners are indispensable. I have found that to stay comfortable for a full day on the trail or trap line, keeping my extremities warm is just as important as conserving heat on my core.

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TOOLS

When packing tools, what truly distinguishes a sophisticated kit is eliminating redundancies. Let's take a few minutes to discuss different options for critical tools so that you can intelligently decide what to pack in a long-term kit.

FARMED

Remember this acronym when purchasing tools for your kit. It is especially helpful when you are trying to choose between multiple brands and styles:

- **F**unctionality—Is this tool designed for only one specific purpose? Or could it be used to complete several different tasks?
- **A**ffordability—Does this tool fit into my budget, especially when considering the total sum of the tools I need to purchase for my kit?
- **R**epeatability—Can I perform tasks the same way with this tool and get the same result each time or is there going to be a long learning curve to master it?
- **M**aintainability—Is this tool easy to maintain over time with a minimum of peripheral gear?
- **E**rgonomics—Does this tool feel good to me for my body stature and build? Will it tire me easily or cause undue discomfort during use?
- **D**urability—Is the tool of good quality that will last for years if well maintained?

CHECKLIST OF FIVE MOST IMPORTANT TOOLS

These tools should be the basis of your kit. When deciding which versions of these tools to include in your kit, think about the environmental

factors, the type of shelter you plan to build, and the length of your stay:

- Knife
- Axe
- Saw
- Carving tool
- Awl

KNIFE

When you're selecting a knife for your kit, the number of choices can be completely overwhelming. It is a good practice to carry a few knives for different tasks.

BUSHCRAFT TIP

Three Knives That Are Worth Carrying:

- 5"–6" knife for butchering
- Knife for fine carving
- Folding knife of high-carbon steel, which can be kept in your pocket

Certain blade profiles are more conducive to certain tasks. A knife with a butchering profile will always be the best overall knife when processing game meat. A slender blade width is better for fine carving tasks, boning, and filleting. If you are building a longer-term kit that includes resources for more advanced tasks in the wilderness, game is going to be a key element to your success. Processing this game for food, tools, and hides is more critical than carving notches so you will need a blade that is specific to this task. A knife for food processing should be about 4"–5" long and

fairly thin at about ⅛" or less. A Scandinavian (V) grind will be most useful, but a flat grind is a close second. Both are easily maintained in the field but are strong enough to act as a primary blade, should you need a replacement.

BUSHCRAFT TIP

Recently there has been much debate over the capabilities of a sheath knife on the hip. Many argue this single tool should be enough to accomplish tasks from fine carving and processing game to splitting firewood. I tend to agree with this philosophy, especially because even if you lose your pack, this knife will always be on your person. Keeping this in mind, be sure to practice using your knife for various tasks before embarking on a long journey.

CARVING TOOLS

In the eastern woodlands, the jackknife, or folding knife, has been considered the best for whittling or fine carving. Morakniv carries a fine line of carving tools. I also like the crooked knife, or mocotaugan, which was a standard carry tool for many native peoples. This knife, similar to the Bent Knife by Deepwoods Ventures, can be used for tasks as versatile as carving canoe paddles to manufacturing replacement handles.

MACHETES AND LONGER BLADES

In many areas of the country a machete may be the best choice of blade in conjunction with a smaller knife. The advantage to the machete is that you can use it to quickly clear a trail or limbs from a tree. It also works as a scraping and crafting tool. In my opinion, the **machete** is truly the

“woodsman’s pal.” Select a size that works best for you, but I find that from the tip of the blade to the base of the handle should be roughly equal to the distance from the elbow to fingertip.

AXE

The main axe you carry should be at least 18"–20" in handle length. A larger axe of 26"–28" in handle length will be much more effective for big tasks such as cutting down large trees. Aside from handle configurations, there are also many head designs and profiles available. An axe with a head weight of up to 3 pounds is good for felling. When selecting an axe, most of the right dimensions come down to personal preference, but whatever you choose, I have found that a good axe is worth its weight in gold on a long trip.

TOMAHAWKS

The **tomahawk**, a personal tool that hangs on the belt, has been used for hundreds of years. It is a backup to a knife. One of the handiest things about the tomahawk is that the handle can be removed so you can use the head alone as a scraping or skinning tool. Tomahawks are too small to process large amounts of firewood or fell large trees, but their handles can be replaced fairly easily if broken, which makes them a good choice for long excursions. There are a lot of tomahawks on the market today, but the ones with heavier heads are most advantageous for wood-processing tasks.

HATCHETS

The decision to carry a tomahawk or a **hatchet** depends on your individual needs and the environment. A smaller crafting-type hatchet can be carried along with the larger axe. Hatchets can be carried right on the belt and are very easy to wield with one hand. They are handy for fine

carving and small chopping when processing fire materials. Look for varieties that are designed to put the centerline blade in the proper location when you are choking up on the handle so that it works as a carving or skinning tool as well. Hudson Bay–style heads are great in this application.

SAWS

Folding saws make an excellent addition to your kit as long as the blade is not too aggressive. By aggressive I mean a blade with larger teeth and a wider kerf, or distance between teeth; these do not make fine cuts. It is better to select something with smaller teeth and a narrow kerf. I see many folding saws on the market today with aggressive pruning-type, green-wood blades. The problem with that configuration is that it limits the uses of the saw. A folding saw is most efficient when it doubles as a notch-cutting saw, and for that reason, a crosscutting blade will be much easier to control and your cuts will be cleaner. There are a lot of varieties in the market, but I find the best blade on a folding saw with the best longevity is Bahco's Laplander model.

- **Fixed-blade saws**: These saws include not only crosscutting or dovetail saws but also pruning blades. The types of saws you include in your kit will be dictated by what you plan to do with them. If you are carrying a bucksaw or bow saw that has a green-wood blade, then a simple crosscut blade with a bit finer teeth will be much more desirable than a pruning-type, green-wood blade.
- **Bow Saws and bucksaws (frame saws)**: These are safe choices, and their easy use helps to save precious calories. Include one of these in any winter kit, no matter the length of your stay. For longer-term kits, just be sure that the blade is at least 20" long and has both a green-wood and dry-wood blade. The advantage to a bow (metal-frame) saw

is durability. I recommend these for long-term outings. Even though it is made from metal, the frame is actually a hollow tube so the difference in weight is negligible.

AWL

In the trade ledger from the American frontier days, the **awl** was one of the most traded metal items, second only to the knife. Awls are designed to punch holes in materials such as leather, bark, and wood. There are many different types of awls, but the crooked awl is the most versatile. These tools are two-sided with three or four sides to each point. The taper of the awl is usually a little different on opposing ends so that you have some versatility when drilling holes. You can easily fashion a handle for one end of this tool if needed or add a hole for lock-stitch sewing tasks.

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COMFORT

In this category you should think about how to get a good night’s rest in both long-term and short-term scenarios. Even if you are planning to set up a permanent shelter, you need to be prepared to set up a temporary shelter in case you need to leave base camp for a day or two. A good Egyptian cotton, oilcloth tarp of 8' × 8' minimum, like the one available from Tentsmiths, combined with a moisture barrier such as a tick mattress and a stout woolen blanket will do in the coldest of climates. Just make sure you have a proper bed and fire. The Pathfinder 100 percent wool blanket, from Self Reliance Outfitters, will work as a good three-season blanket, as will Witney (check eBay), Hudson’s Bay (available through Woolrich or L.L. Bean), or Tony Baker blankets. You can also look in surplus stores for any blankets that are guaranteed 100 percent wool. Any woolen blanket should be entirely made of wool and should be queen-sized or six-point dimension, approximately 96" × 96".

HAMMOCKS

Hammocks afford many advantages, even for use in a long-term shelter, and give a very comfortable night’s sleep. They have been commonly used by woodsmen since the 1800s. Older versions were fashioned from balloon silk, rope netting, or canvas. Balloon silk is not that different in consistency and weight to the parachute-type material used to make hammocks today. Hammocks can be a great three-season option when combined with a blanket. They can even be used in cold weather if you use some kind of quality underquilt that will combat convection issues associated with hanging above ground. A lot of hammock manufacturers now make a bug net that is either built into the hammock or available as an add-on. These nets create a screened enclosure, offering added protection from bugs.

TENTS

Small backpacking-style tents provide comfort and security from bugs and other wigglers. The downside is that their construction restricts your view and eliminates the ability to use fire as a heat source. There is always a tradeoff with any piece of gear! There are a lot of different types of tents on the market, but I would suggest selecting one that is made of the heaviest material you feel comfortable carrying. You will appreciate the durability. One other possible downside to consider is that condensation tends to form inside the tent walls at night, which can make them colder than open shelter. Look for varieties with mesh tops and a rain flap, which helps alleviate the condensation issues.

BIVVIES

A **bivvy** is usually a small tube-style bag that is made for a single person and can be set up very quickly. The same rules apply to bivvies as to tents: Look for durable material with mesh and a closable rain flap to help prevent condensation. Some manufacturers offer bivvies that have a sleeping bag included, like a self-contained sleeping unit.

TENT COTS

There are also tent cots made especially for hunting. These are self-contained tents and sleeping cots built into one unit. They can be quite comfortable and provide all the advantages of a raised bed and closed tent.

ULTRALIGHT COTS

Ultralight cots provide a comfortable raised bed in just a couple of minutes. These cots fold up very small and are extremely light, which makes them a great option for a good night’s sleep on longer treks.

BUSHCRAFT TIP

Point blankets are a type of wool trade blanket most associated with the Hudson Bay Company. These old standbys have been sold in North America since 1779. Point blankets have a series of colored lines (points) woven into them on one edge signifying the size of the blanket. During the fur trade era the largest point blanket was a four-point blanket of about 72" × 90". Modern point blankets can be found up to six points, or approximately 96" × 96". In today's terms, a four-point blanket would fit a full-sized bed, and a six-point blanket would fit a queen- or king-sized bed. In the old days these points were also used to signify how many finished or "made" beaver hides the blanket was worth. So a six-point blanket was worth the value of six "made" beavers or the equivalent in another fur.

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CONVENIENCE

Items of convenience are the lowest priority when building an emergency or survival kit, but in a long-term scenario these items are very important. These are the items that make camp life “smoother” and also add to the longevity of your supplies. They include things that repair and refurbish, candles, navigational aids, extra containers, even snowshoes.

PRIORITIZING ITEMS OF CONVENIENCE

- Repair kits with additional tools
- Premade tinders and fire extenders
- Varied cookware such as folding reflector ovens and skillets
- Additional tarpage for making shelter over work areas
- Additional cordage for major projects like nets

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TIPS AND TRICKS

1. Any handled tool should have a handle of wood for ease of replacement in the field.
2. In a pinch, the blade of a bow saw can always be used with a frame saw that you fashion yourself from natural materials such as wood.
3. Save the most precious resources as a last option. For example, never start a fire with a lighter if you can use a ferro rod, and never use a ferro rod if you can use the sun (which is a renewable resource).
4. “Opossum mentality” is always key: Think like a scavenger. Never pass over a needed resource thinking that you will run into it again. This is especially true with materials related to fire, food, or medicine.
5. Any piece of your kit should be versatile enough that it has at least three viable uses.

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Chapter 2
NATURAL RESOURCES

“Preconceived notions, especially when one is fairly brought up in their influence, are most difficult to shake off.”

—STEWART EDWARD WHITE, *CAMP AND TRAIL*

Natural resources are a critical component of woodcraft and bushcraft. Trees are especially beneficial because they are accessible throughout all four seasons. It’s true that some resources within a tree may be better harvested during warmer seasons, but the lumber, roots, and inner bark are always available. There are many trees in the eastern woodlands, and talking about all the specific species is beyond the scope of this book. However, you will learn about some of the most prevalent families of trees, like pine, willow, poplar, oak, and birch, and how to thoroughly use the resources they offer.

BTUS FOR WOOD BURNING								
SPECIES	HEAT PER CORD (MILLION BTUS)	% OF GREEN ASH	EASE OF SPLITTING	SMOKE	SPARKS	COALS	FRAGRANCE	OVERALL QUALITY
Black locust	27.9	140	Difficult	Low	Few	Excellent	Slight	Excellent
Black walnut	22.2	111	Easy	Low	Few	Good	Good	Excellent
Bur oak	26.2	131	Easy	Low	Few	Excellent	Good	Excellent
Eastern red cedar	18.2	91	Medium	Medium	Many	Poor	Excellent	Fair
Honey locust	26.7	133	Easy	Low	Few	Excellent	Slight	Excellent
Larch (tamarack)	21.8		Easy-med		Many	Fair	Slight	Fair
Lodgepole pine	21.1		Easy		Many	Fair	Good	Fair
Maple (other)	25.5	128	Easy	Low	Few	Excellent	Good	Excellent
Mulberry	25.8	129	Easy	Medium	Many	Excellent	Good	Excellent
Osage orange	32.9	165	Easy	Low	Many	Excellent	Excellent	Excellent
Ponderosa pine	16.2	81	Easy	Medium	Many	Fair	Good	Fair
Red oak	24.6	123	Medium	Low	Few	Excellent	Good	Excellent
Rocky Mountain juniper	21.8	109	Medium	Medium	Many	Poor	Excellent	Fair
Silver maple	19.0	95	Medium	Low	Few	Excellent	Good	Excellent
Spruce	15.5	78	Easy	Medium	Many	Poor	Slight	Fair
Sycamore	19.5	98	Difficult	Medium	Few	Good	Slight	Good
White oak	29.1	146	Medium	Low	Few	Excellent	Good	Excellent
Willow	17.6	88	Easy	Low	Few	Poor	Slight	Poor

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PINE

The pine tree is one of the most abundant trees in the eastern woodlands. It also provides useful resources throughout all four seasons. Since the pine tree is a conifer, it does not lose its needles in the winter when many other tree species drop their leaves. Let's take a closer look at this tree from the outside in to better understand its resources.

Pinewood is fantastic because, due to its resinous nature, it will burn quickly and can be used to make a fire lay even in wet weather. The dark black smoke that you see from a fire made with pine is a product of the resins from within the wood burning off. Pine is a softwood that can make a very effective bow-drill hearth and spindle set—although be careful to avoid the resins or the set will simply polish and not burn. Pine makes a decent carving wood but is not as durable for utensils as other woods.

Pine needles

SAP/RESIN

Pine resin is usually found on the outermost part of the tree where an injury has occurred. The dripping or secretion allows you to access and

collect something from inside the tree without hurting it. This resin, or **sap**, is like liquid gold and should be collected at any opportunity that presents itself. I carry a separate 4-ounce tin so that I can collect sap anytime I come across it and store it in my kit. As a medicinal resource, pine sap can act like new skin on a shallow cut and generally works as an antiseptic when caring for wounds. The resin itself is highly flammable and is therefore a great flame extender within the fire lay. A very good adhesive, called **pine pitch**, can be made by heating the sap and adding equal parts charcoal and a binder like cattail fluff or herbivore dung. Use a low heat when melting the sap because it becomes very brittle when burned. The resulting glue can then be stored in a tin or wrapped on a **pitch stick** by winding it like cotton candy on a stick and drying it one layer at a time. This stick can later be heated over a fire to soften the glue for application.

NEEDLES

Needles on eastern pines are extremely nutritious and have more vitamin C per weight than a fresh-squeezed orange. Also high in vitamin A, these pine needles make an excellent tea for boosting the immune system. Pine needle tea also works as an expectorant and a decongestant. The tea can even be used as an antiseptic wash or fomentation. Not all pines taste the same, so you should try different types to find what you like best. You can fashion beautiful coil baskets from pine needles, although this task is tedious. Dead pine needles are fantastic additions to any fire lay as the resinous needles are highly flammable. They also make good coarse materials for a bird’s nest when making primitive fire.

ROOTS

Certain tree species, such as the spruce, have very long roots that grow just under the surface of the ground. These roots can be harvested in long

lengths and used for cord or basket weaving. Once the root is harvested, the outer bark must be removed to make the root more pliable. You can remove the bark by pinching the root between two sticks and pulling the root through, removing the bark as you go. Keep the roots wet so that they are easier to handle. Larger roots can be further split to make the resource last even longer.

FATWOOD

The area of the tree commonly known as the **fatwood** will collect the resins best because it's where the sap settles. Oftentimes the stump and root ball can be an excellent source of fatwood. Not all tree species have a lot of sap, so you will need to experiment with what you have. It is safe to say that *all* pines will contain some fatwood. Many times, a dead standing or fallen tree will have a root ball that is completely saturated with resin. That is the gold mine! If you find yourself in need of an emergency fire-starting device, remember that fatwood is highly flammable. When you combine the accelerant value of resin with the wood as a slow-burning fuel source you have a natural pairing. Choose an area of a living or dead tree where a branch has grown and cut the branch as close to the trunk as possible. Here you will find at least a few inches of fatwood. To process this wood for starting a fire, locate the dark, orange-colored fatwood area and scrape this into fine shavings with the back of your knife. This material will ignite with an open flame or a ferrocerium rod.

INNER BARK

The inner bark can be used as a food source. It also holds many antiseptic properties and can even be used as an impromptu bandage. When dried, the inner bark can also be used to make slats for woven baskets.

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WILLOW

Willow is a water indicator tree, since it only grows well in wet areas along river and stream banks, drainage areas, and lakesides. Willow wood is soft, good for carving, and one of the best materials for a hearth and spindle when making a bow-drill fire set.

Willow leaf

LEAVES AND BRANCHES

Willow leaves and the inner bark contain salicin, which is one of the chemical compounds used in aspirin. A decoction of the inner bark will make a fairly good headache remedy, and chewing the leaves will alleviate a toothache.

The branches of the willow grow long, and new growth is fairly straight, which is why they make passable arrow shafts. Willow branches are pliable and can therefore be used to make quick basket containers as well.

INNER BARK

Willow’s inner bark can be used to make baskets and pack boards. The bark is best harvested in the spring and early summer when the bark is loose and can easily be pried from the tree with a wedge. The outer bark can then be separated by peeling the inner bark from it. As with most of these types of components, the inner bark is most workable when kept wet.

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POPLAR

There are many poplars in the eastern woodlands. The tulip poplar (sometimes known as the yellow poplar) is one of my favorites, but it is actually a magnolia and not a true poplar. Daniel Boone’s canoe was carved from this wood. The poplar is a soft tree and therefore makes an excellent primitive fire set such as a bow drill. The poplar makes a fine spindle as well as a hearth board for this purpose. Also fine for carving, it makes easy small camp items like spoons and spatulas.

Tulip Poplar leaf

LEAVES

The leaves and the barks of this tree are very astringent and can be used medicinally for drawing infection or for driving toxins, like the oils from poison ivy, to the surface. A hot fomentation combined with a wash is one of the best ways to rid your skin of the ivy oils that cause rash. When taken as an infusion, the leaf tea is binding and can relieve diarrhea.

OUTER BARK

During the spring, easily remove the outer bark by prying it from the sapwood with a wedge or your axe blade. You can use this bark to make bark containers from baskets to arrow quivers. To do this, make two circular cuts through the bark around the tree; the distance between the cuts should be the desired length of the piece. Then, to open the bark, make a vertical cut by inserting a wedge between the bark and sap. You can then slowly peel off the outer bark. Remember that peeling off the bark will kill the tree, so make sure it is absolutely necessary before you do it.

INNER BARK

In the eastern woodlands, the inner bark of the poplar is one of the most prized resources next to pine sap. The inner bark provides both bird's nest material and tinder bundles for fire. When harvested green, it also makes a strong reverse wrap for two-ply cordages. Many times the inner bark fibers can easily be seen through rotting bark hanging off the branches. If branches are dead but not shedding, the back of your knife will easily process this to make the inner bark accessible.

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OAK

The oak, with its heavy grain and hard wood, has traditionally been used for construction. Oak is excellent for crafting wooden tools and even replacement handles for tools. There are two major groups of oaks: red oak and white oak.

- **Red oak** is great for any building materials like slat boards and dimensional lumber. Red oak is a fibrous wood that handles bending stress easily, so it can also be used for making bows. Red oak can be used to heat-form many supplies such as pack frames and snowshoe frames.
- **White oak** represents the medicinal side of the oak family. In medieval times, the white oak leaf was the symbol for materia medica, that is, the collected knowledge about medicines and the conditions they were used to treat. The inner bark of white oak can help relieve sinus congestion and headaches. Due to the high level of tannins, the leaves and the barks of this tree are very astringent and can be used for drawing infection or for driving things to the surface, like the oils from poison ivy, and for relieving diarrhea. White oak is antiseptic in nature, so decoctions of this bark make excellent mouthwashes and gargles for sore throat or gum problems.
- **Oak wood** is a long-burning hardwood, which makes it a great choice for all-night fires and for creating coal beds in cook fires.

Oak leaf

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SASSAFRAS

I include sassafras here because of the carminative value of the root tea. Finely ground dry sassafras leaves will also add a cinnamon-type flavor to foods such as bannock, a quick-fry bread. Sassafras was a mainstay tonic from colonial times until the 1960s when the FDA conducted tests that showed mass amounts of safrole caused liver cancer in rats. Root decoction can be used to ease upset stomach and regulate the digestive system.

Sassafras leaf

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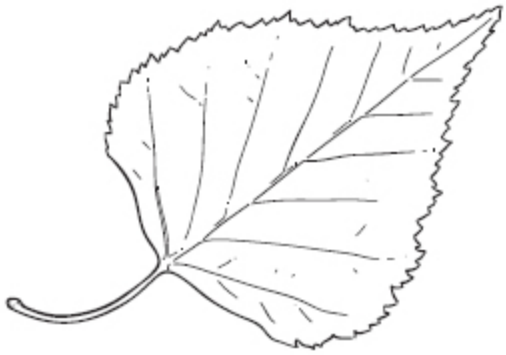
BIRCH

There are several species of birch throughout the eastern woodlands, but black and river birch are the most prevalent in the middle ground areas of the Ohio River valley. All birches contain oil that can be extracted from the bark, and it is so flammable that it can often still burn even when damp. Birch is an excellent carving wood and is the preferred material for Scandinavian-made knife handles.



Birch leaf

BIRCH BARK

Birch bark provides probably the most versatile and even life-saving resources of all the trees in the eastern woods, save maybe the pine. With its rich and volatile oils, birch bark burns with a dark black smoke that in the summer can help drive off insects. It is virtually unmatched in its ability to burn in damp conditions, and when using open flame it requires almost no processing to quickly create a hot, warming fire while drying marginal tinder as it goes. Birch bark is also prized as a material for crafting containers of all sorts and for weaving to make baskets and sheaths. Native peoples used birch bark to make the outer skin of canoes. It is best to harvest the bark from live trees between May and June, but this tree is so

resilient and resistant to rot that bark can even be harvested from dead trees. It is possible to harvest the outer bark without killing a live tree as long as you are able to do so without disturbing the inner bark. Make test cuts to determine the thickness and pliability of the bark before making large harvests.

CHAGA (TINDER FUNGUS)

Birches that grow at higher altitudes or in colder climates are susceptible to a parasitic fungus commonly called tinder fungus (*Inonotus obliquus*), or chaga. Chaga grows in areas of the United States from New England and Michigan down to North Carolina. Chaga has long been sought for both its medicinal and fire tinder properties. It appears as a large blackened ball or mass on the side of the trunk of both live and fallen birch. This fungus has extensive medicinal value; many woodsmen will simply boil a chunk of it in their kettle as a daily tea to drink at camp. When it's used as a fire starter, the yellow soft areas beneath the black outer crust will take the sparks from both steel and rod and will hold an ember to be used for ignition. You can slice it thinly or create a dust that can then be stored in your kit for later use.

MEDICINAL VALUE OF TREE RESOURCES

TREE	MEDICINAL VALUE
Pine	Decongestant, antiseptic, immune system booster
Willow	Pain reliever
Poplar	Astringent, diarrhea relief
Oak	Decongestant, astringent, diarrhea relief
Sassafras	Regulate digestive system
Birch	Antiseptic, insect repellant

BIRCH OIL

Birch oil is extracted by using two containers of metal or clay. The first, called the **catchment container**, is buried below ground to the rim and

surrounded by dirt. The second container is filled with birch bark and sealed with a drain hole or holes in the bottom from which oil drains into the catchment container. This container is placed just over the catchment container. A fire is then built around the aboveground container to heat the material and release the oils until they slowly drain into the container below. The process usually takes several minutes to fill a small container. Then the top container is carefully removed to expose the pool of oil below. This oil is highly medicinal and can be used as both an antiseptic and an insect repellant. It is also flammable, so be cautious when using it.

BUSHCRAFT TIP

Birch oil can be further rendered into birch tar. To create birch tar you will need to slowly heat the oil to a boil like a gravy and then stir. Be careful because both the fumes and the liquid are highly flammable. Once rendered to a thick paste it can be rolled onto a stick where it can be stored for later use. This form of storage is called a **pitch stick.** The tar can also be molded onto squares or balls for storage and later use. Birch tar can be used for many purposes. When reheated, it is a completely waterproof gluing material. It is also a flexible adhesive and can be used for hafting and sealing both containers and leathers such as moccasin seams.

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ITEMIZE

It’s true that plants and trees provide many resources, but it is absolutely critical that they are identified correctly before using them. A friend of mine, Green Dean, teaches a simple method for this called ITEM:

- **I**—Properly **I**dentify the plant with at least two resources.
- **T**—Consider the **T**ime of year: Is the plant growing or blooming in the proper season for its species?
- **E**—Observe the **E**nvironment: Is the plant or tree growing in a location true to its nature? For example, a plant that prefers dry, rocky soil will likely not be found in a marsh.
- **M**—Research the **M**ethod of harvest and preparation. Many plants must be harvested at a certain time in their life cycle, or a certain part must be harvested for use. Find out what method is used to prepare this plant for food or medicine. Does it need to be leached? Does it need to be double boiled to create a decoction?

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MEDICINAL PREPARATIONS

Here are some basic methods used to prepare natural resources for medicinal use:

- **Infusion**—This process is just like making tea. The portions of the plant to be used are placed in water that has already been boiled and removed from the fire. A lid is placed on the container and the mixture is left to steep for 15–30 minutes. It is then consumed as needed.
- **Decoction**—Similar to the way you make an infusion, you are going to boil water. With a decoction, however, you will add the bark or roots to the boiling water while it is still on the fire and simmer until half the liquid remains. Then add water to the original amount again and repeat. Once you have essentially twice-boiled the liquid, it can be strained and consumed or used as needed. Note: This method is always used for extraction from bark and roots.
- **Fomentation**—A fomentation is an infusion or decoction in which a cotton material has been steeped for about 5 minutes and is then wrapped or placed on the skin.
- **Wash**—You use a wash of either an infusion or decoction to wash or irrigate an area. You can also possibly soak something in it, such as your feet.
- **Poultice**—A poultice is usually the macerated plant wrapped against the skin with a bandage. This method is used mainly for drawing or to reduce swelling.

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TIPS AND TRICKS

1. If you are having problems identifying a tree in the winter months when you have only the bark to examine, look on the ground around the tree. The leaves around it, even if dry, will be a good indicator of what type of tree it is.
2. When using tree bark as a resource, remember that the birch is the only tree that you can ring or girdle without killing the entire tree.
3. After injuring a tree, applying a fresh coat of thick mud will help to protect it from further damage as it heals.
4. Always collect “punky” wood, which is wood that is nearly rotten and very spongy in appearance and feel. Punky wood makes the charred material for the next fire.
5. Keep an eye out for water vines. In an emergency, if water is unavailable, wild grape or water vines will hold water for several months from early spring through summer. Cut the vine close to the ground first and then about 2' higher. A large vine will hold up to a cup of water.

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Chapter 3
WOODEN TOOLS AND SIMPLE MACHINES

"Nature's Priority: Take care of the brain first. Then it will take care of you."

—GENE FEAR,
SURVIVING THE UNEXPECTED WILDERNESS EMERGENCY

In addition to the five critical metal tools discussed in Chapter 1, there are five wooden tools you can easily craft yourself to aid in a long-term outing. The selection is dependent on the type of trip you have planned and what food and meat procurement supplies you are carrying. This list takes into consideration the fact that you are crafting most of your tools as you go in order to keep down the weight of your kit. This is especially true when you are traveling without conveyances.

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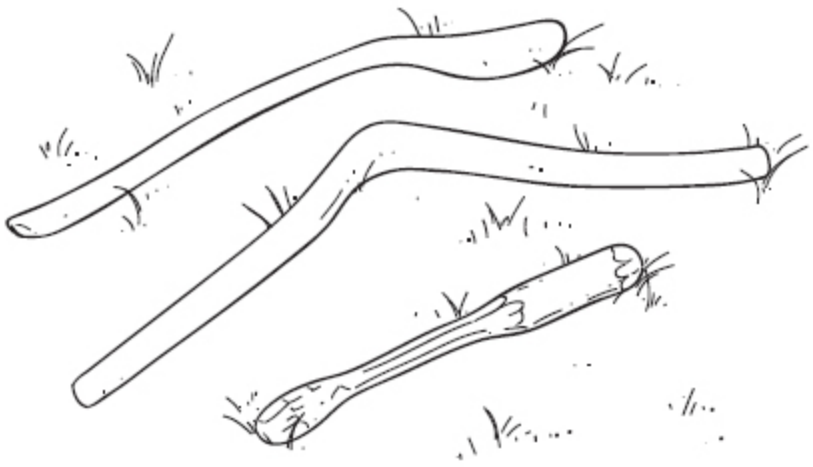
THROWING OR DIGGING STICK

The first thing I usually make while preparing my camp is a **throwing stick**, which can also be used for digging. Although this type of tool is one of the easiest to make, it adds a lot of versatility to your kit. The throwing stick should be made of green hardwood (oak, maple, magnolia) if possible and is about the length from your armpit to your cupped hand, or what I call “axe-handle length.” I cut a 45° wedge on one end and a dull point on the other. This simple tool can be tucked into the back of your belt or bedroll until needed. You now have a ready tool to throw at game on the ground such as rabbits and squirrels, and you can also use it to dig fire-pit holes or uproot plants and tubers. It can be used as a ready baton if needed for processing firewood or even for retrieving hanging deadwood by tying a string to it, throwing it over a branch, and pulling. The most beautiful thing about this multifunctional tool is it only takes about 2 minutes to manufacture and is therefore easy to replace.



Throwing stick

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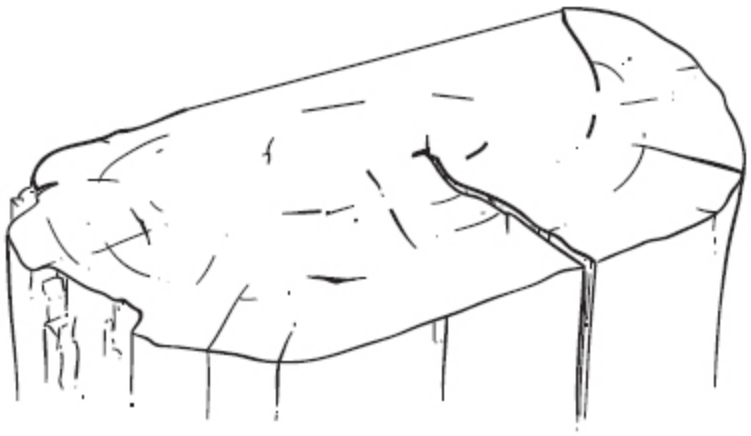
ANVIL STUMP

Find a large stump if you can, or just cut off a piece of log that is large enough for a seat. You will be surprised at the many uses it will afford over a short time. This stump will keep you off the ground and will also function as a workbench and a dry surface on which to process fire tinder and kindling. The anvil stump can also be used much like a sawhorse when you add V notches on the side into which you can place pieces of wood that need to be cut. Just lay your stump on its side and lock the piece of wood you want to cut into the V notch. The wider the notch, the bigger the piece of wood you can lay into it. This will help you avoid driving your axe or knife into the dirt by accident. The anvil stump provides a raised surface for a candle at night as well. The anvil stump can be further processed to make a grinding bowl on the surface and, on the other side, a series of cutouts that can be used to hold sharpening stones and flats of wood that can be used for cutting boards.



Anvil stump (clave)

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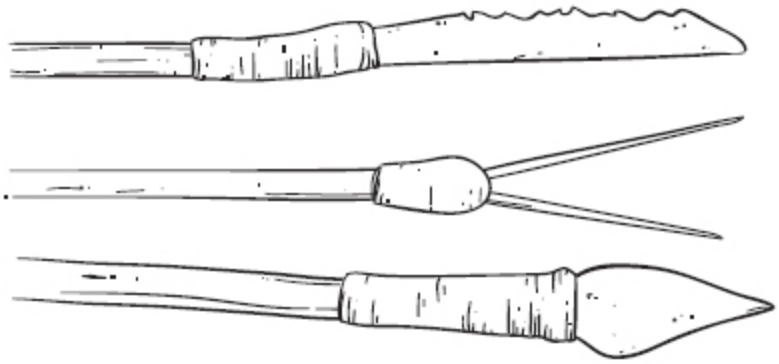
SPEAR OR GIG

The **spear**, simple as it may sound, is extremely useful for a variety tasks when you are roaming. It should be constructed of a hardwood sapling like maple and should be at least 12" taller than eye level when finished. Make a stout fork that has about 4" tines on one end. The other end can be fashioned in one of two ways depending on the environment. If you are close to a good water source, such as a flowing steam or pond, you will want a gigging device on the other end. Make this gig by splitting the end of the sapling in a cross fashion to create four equal tines, each of which are about 6"–8" long. Then sharpen the stick as if it were still one solid piece. After this, two small green sticks will be placed into the crosscuts to force open the tines. You can then lash the stick to keep it from splitting further before sharpening the individual tines.

Once this is completed you have a tool that can be used for hunting things like frogs, fish, snakes, and small mammals in dens. This tool will also give you reach to retrieve nuts or nests from high points in trees. Use your spear for stability by using it as a third leg when crossing streams. You can also use it as a support for hanging a pot over the fire if needed. You will find infinite uses for this simple tool as you travel and hunt.



Spear

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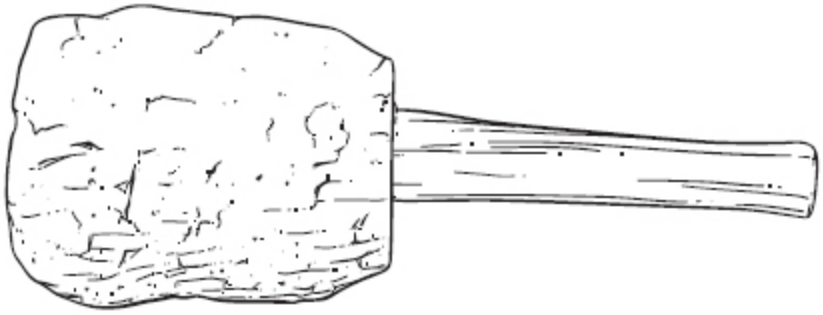
MAUL OR MALLET

A **maul** can be easily fashioned from a cut green hardwood branch. Mauls vary in size, but I would start with a branch that is approximately 16" long and 4" in diameter. Carve the head from the first 6" of the branch and reduce the other end of the cut wood so that it comfortably fits in the hand, making its weight forward like a large, round hammer. This tool can be used for many tasks, especially for striking the back of a metal tool such as your knife or your axe. This tool will transform your axe into a wedge, a chisel, or a sheer cutting device with more control than if you are just swinging it freely. The maul can also be used to baton wood with your knife if the need arises. Finally, you can easily open or smash acorns, nuts, and clam shells with this tool. Because the maul has a larger surface area than the hammer pole on your axe, it’s also a great device for driving wooden stakes and wedges.



Maul

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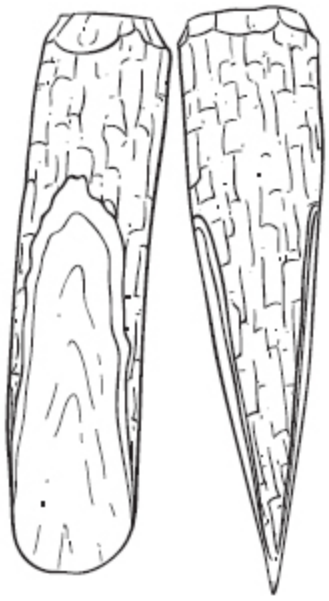
WEDGES

As soon as you need to split wood, you will need to make **wedges**. If you are forced to use a knife for processing wood, a wedge can be vitally important to safely remove a knife that gets stuck during a split. Wedges should be made from green hardwood material and, as with most of these tools, should be made in varying diameters and angles. Wedges can also be used for splitting longer logs to make things like bow staves or dimensional lumber. They’re also useful for separating bark from sapwood to make containers or bark shingles for roofing materials. When not in use, wedges can double as tent stakes. For that reason alone, I recommend fashioning six separate wedges about 1"–2" in diameter and at least 12" long. In this way, these tools become one of the five simple machines you use most often in the woods.



Wedge

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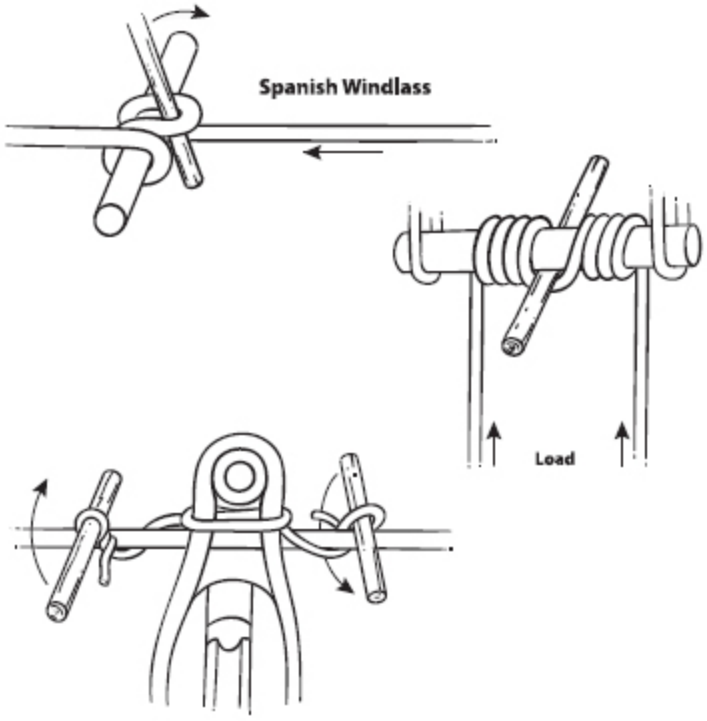
SIMPLE WOODLAND MACHINES

Aside from wedges, there are four other simple machines that you can fashion from wood material found in the landscape to help with tasks in and around camp.

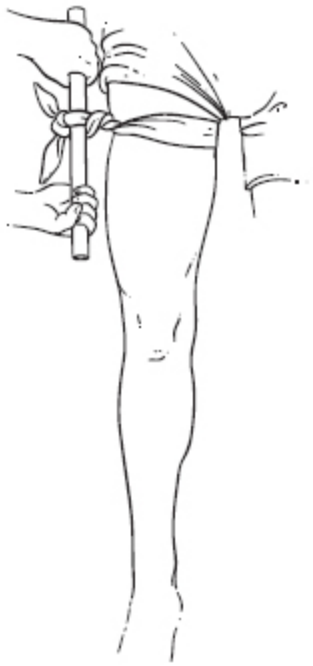
WINDLASS

The **windlass** is used to move heavy weights or for tensioning. Typically, a windlass consists of a horizontal cylinder that is rotated by the turn of a crank or belt. A winch is affixed to one or both ends and a cable or rope is wound around the winch, pulling a weight attached to the opposite end. A windlass can be made even more simply with a loop of cord or rope anchored to a fixed object and then looped around another object to be moved. A lever of proportionate size is then placed within the loop and turned, end over end, to tighten the line until it eventually moves the object.



Windlass operation #1

You can also use larger posts as levers, either at ground level or standing, winding rope to move an object. A windlass can also be as simple as a tensioning device for a bucksaw, made from natural materials. A quick vise can be made from a green stump by employing a windlass to tension the work piece. A windlass operates very similar to a tourniquet in this case. It employs a few wraps of rope tensioned by a stick that is then held in place by tying it off to the lower area of the stump. It acts to constrict the work piece and as a holdfast. Killing-type traps sometimes also include a windlass device.

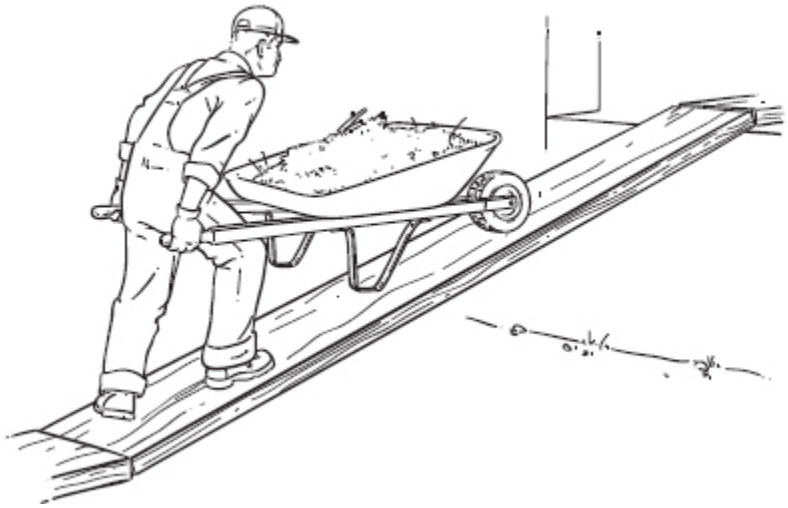


Windlass operation #2

INCLINED PLANE

An **inclined plane** is a simple machine for moving heavy objects above ground. The inclined plane takes advantage of angles in order to lever or pull weight forward on a shallow angle. This makes it easier to lift than pulling dead weight directly from the ground. You can, for example, move a larger log onto a bucking horse or pull a log uphill. To operate the inclined plane you take advantage of the hill and the log as a cylindrical rolling object. From there, you use a windlass to control the task of raising the log uphill.

To pull a log uphill you will take advantage of the incline plane of the hillside. You will need a length of rope long enough to form a W with the center wrapped around a tree at the top of the hill and the two outside Vs wrapping the log. The tails on the outside are used at the top to roll the log up the hill, with two people pulling at the same time.



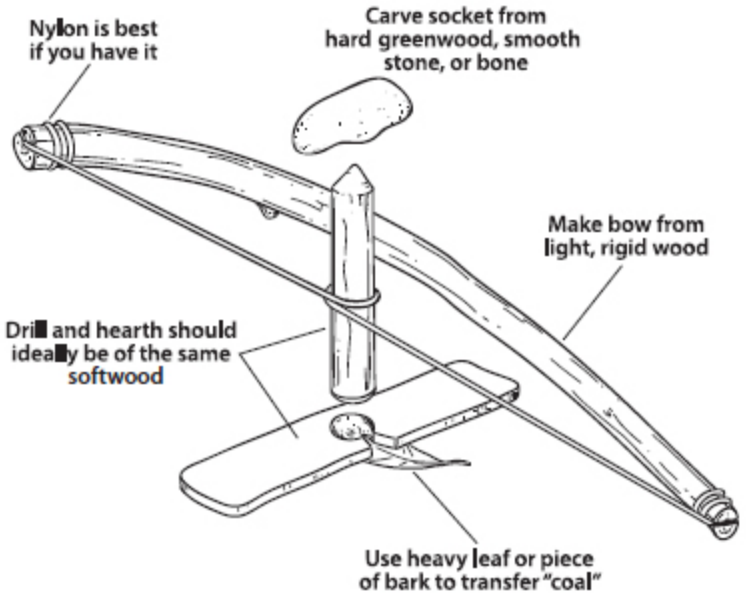
Inclined plane

LEVER AND FULCRUM

A **lever** made of strong material like green hardwood can be used not only to roll large logs and stones across the ground but also to assist in rolling logs up an inclined plane. When using a fulcrum in conjunction with a lever, you can also lift logs and other heavy objects.

BOW AND DRILL

The **bow and drill** is one of the oldest simple machines. It is used as a primitive fire starter and can also be used in conjunction with bits of metal or stone to make holes in other objects. You'll need to create a chuck when using this device for anything other than fire making. (Sometimes chucks are used for making fire too.) For more on this machine see the following chapter.


Nylon is best if you have it
Carve socket from hard greenwood, smooth stone, or bone
Make bow from light, rigid wood
Drill and hearth should ideally be of the same softwood
Use heavy leaf or piece of bark to transfer "coal"

Bow and drill

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TIPS AND TRICKS

1. In the long run you will want dry wood for constructing many tools and handles, so collect good, straight hardwood pieces ahead of time so they have time to dry out completely around camp.
2. Wood will dry out and crack faster once the bark is removed. This can be both an advantage and disadvantage, depending on the project for which you are collecting wood. You may want the wood to form a crack, which will make it easier to split.
3. Always hang on to the shavings and materials you collect during woodworking projects. Store them in a dry place so they can act as ready tinder for fire starting later.
4. Heavy cordage such as rope is one of the hardest things to reproduce from natural material, so this asset will always be a priority for longer-term kits.
5. Any wooden tool will need to be oiled to keep it from drying out over time. Use animal fats or birch oil for this task. When a wooden tool is first made, you should oil it least every day for a week, every week for a month, and every month for a year.

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Chapter 4
ADVANCED FIRECRAFT

“To poke a wood fire is more solid enjoyment than almost anything else in the world.”

—CHARLES DUDLEY WARNER

Fire is the resource that many bushcrafters consider only second in importance to a good cutting tool. Fire is critical for preventing cold-weather injury and providing general comfort around camp in cold environments. Fire can also be used to disinfect water, cook and preserve food, prepare medicines, and keep bugs at bay. There are probably a hundred uses for fire that can contribute to all four categories of your kit (temperature control, tools, comfort, and conveniences). Building fire in an emergency should be easy for a seasoned woodsman. There are plenty of items on the market today, from lighters to road flares, that will almost ensure a flame can ignite even marginal tinder sources.

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PRIMITIVE FIRE STARTING

As mentioned in the Ten Cs of Survivability, you should have three items for ignition in supply at all times:

1. Lighter
2. Ferrocerium rod
3. Magnification lens (sunglass)

Beyond these methods of emergency fire starting there are a number of primitive methods that woodsmen have been using for ages. What distinguishes these methods is that you will be using an ember to ignite tinder materials. There are five fire-starting methods in which every woodsman should be competent: open flame (lighter), ferrocerium rod, magnification lens, flint and steel, and bow and drill. These will ensure that the woodsman is prepared and can be comfortable, or “smooth it,” in a woodland environment. Matches are not included in this list because I do not believe they add anything to what the first methods can accomplish, especially considering the issues that can encumber their use like moisture, wind, and loss of gross motor dexterity in cold weather. Keep matches in your kit, though, to be used in conjunction with any other method of ignition—just in case.

The two most important primitive methods of fire starting to understand are:

1. Bow and drill
2. Flint and steel

Both of these methods use material from the landscape and your high-carbon blade. The bow and drill kit can be made with your stone or glass

tools, but a knife makes the job much more convenient. Some would tell you that to truly practice a primitive skill you must always use primitive tools. The truth is, in modern society it is easy to find metal and glass materials to use.

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THE BOW AND DRILL METHOD

You will use your bow-drill kit to create an **ember**, a smoldering coal to add to a bird's nest of combustible materials. The ember is a critical component of the bow-drill kit because you cannot make fire without it.

To create fire you need three key elements known as the **triangle of fire**: heat, oxygen, and fuel. To create the smoldering coal, your set must take maximum advantage of all three. Methods in survival are like processes of manufacturing in that all inputs will affect the output. It is crucial that you ensure many things happen—and in the correct order—so that you get the desired output.

The bow and drill set has four components:

1. Spindle or drill
2. Hearth board
3. Bearing block
4. Bow

Used correctly, these components work as a simple machine that removes material and causes a fine dust to accumulate. The dust is then heated by the drill's friction at which point oxygen in the surrounding air will allow ignition. Choosing the correct components, using the right form, and understanding when and how much pressure and speed to apply are the key inputs to this process. The only variation should be in the resources you select.

SPINDLE

Make the **spindle** from a softwood so that when you push down on it your fingernail leaves an impression. Poplars, cedars, willows, and pines

are all good woods to use. The spindle only needs to be about the same diameter as your thumb and the length from your outstretched thumb to pinky. Since you will be carving both ends, it is okay if it is even a little bit longer.

The spindle needs to be as straight and round as possible. If your wood piece is slightly crooked or bent, use the back of your knife to carefully shave it a little at a time until it is straight. Next it is time to prepare the ends for use. One end of the drill should look like a worn eraser on a pencil: slightly rounded but still basically flat. This end will be placed on the hearth board to create maximum surface area and friction. You want all the friction between the spindle and the hearth to be in this spot. The top of the spindle needs to be shaped like the lead side of a pencil: a pointed shape but slightly dull. Make sure there is very little friction at the top of the spindle so that you can push and pull the bow easily.

Spindle

HEARTH BOARD

The **hearth board** should be made from the same softwood as the spindle. The wood should be dry but not in a state of decay. I prefer to use wood from the tulip poplar because the lower branches often hang dead from the tree and, barring a hard rain, are able to dry out above ground. You will want your finished hearth board to be about as long as your forearm

and as thick as your thumb. Select a limb or piece of wood larger than what you need so that you can split it down to make a flat board with these dimensions.

Careful construction of the hearth board and the notch, which must be made correctly in order to achieve a collection of material for a coal while gathering enough oxygen for ignition, is the most important step. Make a small divot in a spot on the hearth. Where you make this initial starting point is dependent on whether you are left- or right-handed, as part of the board will be under your foot. Just make sure the divot is not too close to the end as that may cause the board to split or break out under pressure. A good starting point would be about 2" from the end closest to your dominant hand. You do not need make this divot very deep; it only needs to guide the spindle during the burning process.

BEARING BLOCK

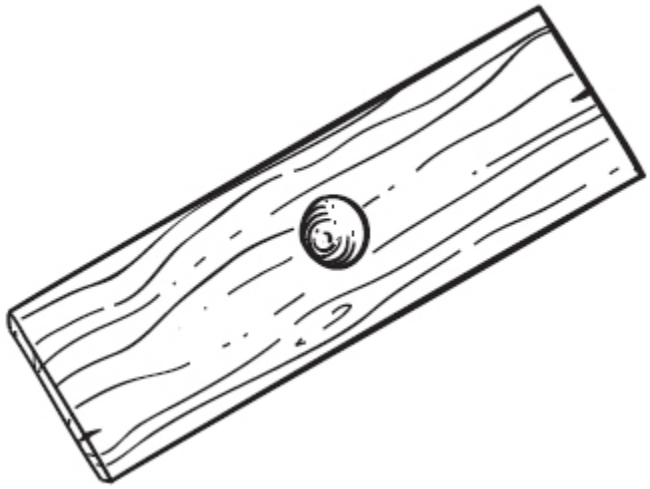
The **bearing block** is a key part of the set but is probably the least understood and the most complicated to start. It should be made from the hardest wood available, such as hickory or beech. Softwoods quickly start to wear away, which causes the spindle to rub on the angled areas below the point. This common mistake is called **shouldering out**, and it will leave the operator exhausted and inhibit the set from running smoothly. Select a green sapling that is about 3" in diameter and cut out a 4"–5" piece on the widest end. Then split one-third off the sapling using your knife.

BUSHCRAFT TIP

As mentioned, the bearing block is the most difficult item to produce, and it controls everything. In general, any hard, natural

material makes a good block as long as a divot can be carved into it. Rocks, bones, and antler will all work.

Use your knife to create a small divot on the flat side of this block, right in the middle. The divot only needs to be large enough to accept the point of the spindle. A free-spinning drill will be easy to operate. If you are having problems with your setup, the spinning drill is the first place to double-check.



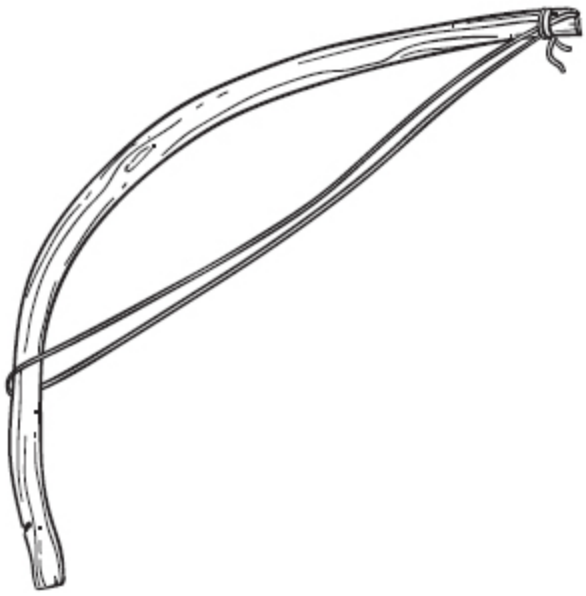
Bearing block

BOW

The bow can be made from any branch and does not have to necessarily be bent like a bow, but it needs to be fairly stiff so that it does not break under strain. The bow should be about 3' long and ½" in diameter. The longer the bow, the fewer the number of strokes it will take to make the revolutions of the spindle. A common mistake is to use a bow well under 3'.

Making the bow is as simple as tying a string to a branch. There are many complicated notches and holes you can create to string the bow, but I

have found that a simple fork on one end of the stick with a loop and a stake notch on the other end to tie it off with a straight lashing and a clove hitch works best. The string does not need to be so tight that it causes the bow to bend in order to load the spindle, but the string cannot be so loose that the drill slips under downward pressure.



Bow

THE BIRD'S NEST

The ember that you ignite with your bow and drill will be used to ignite a **bird's nest**, a key part of your fire lay. The bird's nest must be made up of coarse, medium, and fine materials. In fact, most of the materials you gather to make the hearth and spindle can also be used when assembling the bird's nest. The inner barks of the poplar or willow, or bark from the cedar, all work well. There are lots of other items that can be used in the bird's nest: for instance, small dead pine needles and materials with a natural accelerant or highly combustible oils like birch bark. Be careful not to use too much

dry grass and leaves because these items burn quickly and it is important that the bird's nest burn long enough to ignite the rest of the fire lay materials.

Bird's nest

Processing Material for the Bird's Nest

Processing is the task of shredding barks to amass a quantity of fine material. It is the most important task in constructing the bird's nest. Make sure you place something to catch the shreds so that they do not fall onto the ground. If the material you are collecting is still attached to the tree, you can use the back of your knife to process the shavings. If the material you are collecting is wet, process it immediately and spread it out over a larger surface so that it will dry quickly. You can place some of this processed material between layers in the cloths around the core body area to dry them or spread them out on a dark surface (like a tarp) in the sun. Once the

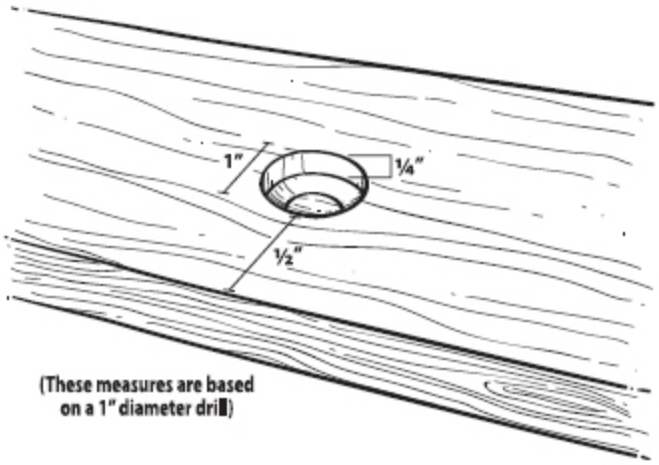
material is dry it can be fashioned to look like a bird's nest. If you come across a bird's nest in the wild, take a look at how it is constructed. When building their nests, birds place fine material in the middle or center and add progressively coarser material as they work their way to the outside. Remember the best bird's nest for a fire lay is an actual bird's nest, so be sure to collect one if you find it available and unoccupied.

BURNING THE HOLE AND MAKING THE NOTCH

Now that the components of your bow drill are ready, it is time to get started. First load the spindle onto the bow. Place the spindle on the divot on the hearth board. Set yourself up with the correct form: Make sure your wrist is locked into your shin in order to prevent the spindle from moving side to side. Make sure there are no obstructions that will interfere with the full movement of the bow. Lean forward to push steady downward pressure on the spindle with the bearing block. Your chest should be over your knee. Begin to apply enough downward pressure with the bearing block to hold the drill in the divot as you slowly rotate the spindle. It is important that you move slowly because this step will marry the drill to the divot for when you begin to create the coal. If you use the entire bow with steady strokes, downward pressure will create enough friction to begin burning the wood. Stop once the wood has burned around the spindle and things are running smoothly because using too much of the material now reduces what you have to make a coal.

Next you need to make a notch from the center of the freshly burned divot hole to the edge of the hearth board. The notch must be made correctly in order to achieve a collection of material for a coal while gathering enough oxygen for ignition. You always want the notch to the front of the board facing away from you because this will allow you to easily view the process when operating the drill. Take care that your notch

area is not too narrow, which would cause it to clog up, prevent overspill, and limit oxygen to the ember. Alternately, make sure the burned divot hole is not too big because the dust needs to be compact and the oxygen controlled. A proper notch should be in a V cut in which the bottom of the V goes approximately ⅛ the size of your burned divot circle into the blackened area. The angles of the V should be between 30°–45°.



Constructing the bow drill

MAKING AN EMBER

Now that you've burned your spindle hole and made your notch, inspect each component carefully before attempting to make a coal. Any issues at this point will only get worse later.

1. Check the bowstring for stretch and retighten if necessary.
2. Check the bearing block to make sure the divot is not getting too deep and that the spindle has not begun to shoulder out.

Now you are ready to begin making fire with sticks! There is one extra, small task that makes things easier and might save a good coal from going out due to ground moisture. You need to make a **welcome mat**, a place for

your coal to flow onto once it is created in the notch. The welcome mat can be a small sliver of bark or a thin piece of wood that is about two times as wide as the notch. This piece will go under the hearth board to catch the coal.

Operate the bow slowly at first to establish and maintain a rhythm. Your chest should be over your knee so that you can easily observe the activity in the notch. You don't need speed yet; you want steady, long strokes that use the entire length of the bow while you exert downward pressure. At this point the goal is to remove material from the board and the drill and fill the notch with dark brown fluff. Many folks make the mistake of moving too fast, assuming speed will make an ember, but the fact is, if there is no dust in the notch, you have no fuel to create the ember.

After several strokes you will begin to see smoke and the notch will start to fill with material. Once the material in the notch begins to spill forward in front of the notch you can increase the cadence of your bow strokes by about two to three times; it should only take about 10–12 full strokes of the bow at this point to create a burning coal. Stay steady and make sure you do not make a jerky stop that might disturb the coal you created. Slow down during the last couple strokes and stop in the same position you started. Slowly remove the spindle and bow and observe the coal. If it seems to be smoking outside the board where the dust has gathered, you are probably home free. Don't get too excited though, because you still have a lot of time left in the process, probably about 5 or more minutes. Slowly lift the board at an angle and tap it gently with the spindle to dislodge any material that might be clogged in the notch. If the coal is still smoking at this point, you can sit back and relax for a minute, catch a few breaths, and smile!

USING THE COAL TO IGNITE THE BIRD'S NEST

Now comes the most important part of the equation. Always bring the bird’s nest to the coal—never the other way around. Make any necessary adjustments to your bird’s nest to make sure there is plenty of fine combustible material in the middle. Tilt the nest toward the welcome mat and pick up the welcome mat, moving it toward the nest. Then slowly tap the welcome mat to dump the coal into the nest. This should only be a ¼" drop at most! Slightly fold the nest and begin to add some oxygen by breathing into it slightly, not hard blows just light breaths. If the coal is still burning strongly, you can tilt the nest slightly so that you are blowing up into it, causing the heat to rise into the bulk of the nest. As the ember grows, smoke will begin to roll from the back of the nest, which is the cue for you to blow a bit harder. As the smoke thickens you can increase the oxygen until it begins to burn. Once the nest starts to flame, turn it over so the flames are on the bottom and heat rises to the nonburning material. Finally, place it into your fire lay and make a fire!

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FLINT AND STEEL METHOD

The **flint and steel method** is important for you to understand for the same reason you need to know the bow and drill method: in case some kind of emergency causes you to lose the majority of your gear. As long as you do not lose your primary cutting tool of high-carbon steel, you should be able to find a rock in most regions that will drive material from the back of your blade and help achieve this method of ignition. It may take some searching to find a rock that will work for this task, but generally any flint, chert, or quartz rock will work if you can break or find a sharp edge.

For this method you will need to drive small shards of iron material from the back of your knife with a rock. These particles will combust with friction and oxygen at 800°F. Why is this important? Remember, if you need to make a bow-drill fire, it is because you have lost the majority of your kit. You want to avoid having to make two bow-drill fires if you can help it, so you make charred material as soon as you have set the first fire.

MATERIAL FOR FLINT AND STEEL IGNITION

The best way to ensure an easier fire after the bow drill is to have charred materials ready for the next time around so a flint-and-steel fire can be made instead. Some funguses such as chaga (true tinder fungus) will take the spark from this method without having to char it first. You can also get the dust from some types of shelf fungus (*Fomes fomentarius*) to accept a spark. To accomplish this you will require a small pile of dust that you have created with a saw cut or by scraping with the back of the knife. Once the dust has ignited it must be left to grow into a coal, whereas the true tinder fungus can be ignited within a larger piece and the dust is not necessary. With either, you want to use the softer, inner materials, not the outer, hard surface.

An alternative is char material, which even better ensures a spark for ignition. Char can be made from many things you find in the landscape, including punky, decaying wood or the inner pith from some plants like mullein. You can also use materials that are 100 percent cotton from clothing or your kit.

Making Char

The easiest way to make char is to place your chosen material in a metal chamber where you can subject it to high heat while limiting oxygen. In this chamber, gases are able to escape as the material is heated inside. A stainless-steel bottle and nesting cup will work nicely, or even in an emergency an old can with a flat rock. Place your material inside the chamber and then place the chamber in the fire. Coals are better than direct flame but either will work. As the material is heated, smoke—which is actually gas—will begin to escape the chamber from any place that is not completely sealed. This is okay just so long as oxygen cannot enter the chamber. Once the smoke stops, the charring should be complete. It is very important to wait until the chamber is completely cool before opening it because if oxygen contacts hot material it will cause it to burn.

BUSHCRAFT TIP

There are many advantages to making char material. For one, char is highly combustible, so adding it to the marginal materials within a bird's nest gives an extended heat source for effecting ignition. In fact, charred material can be ignited with almost any spark from old lighters, ferrocerium rods, or a sunglass. Given its variety of ignition methods, char is an important material to keep in good supply in your kit.

Inspect the char. If it is black and frail looking, it is most likely ready. If the material is brown, close the chamber and put it back into the fire. You can also test a small amount of the char to make sure it is ready. Many woodsmen carry a specific container such as an Altoids tin or an old shoe polish can, called a char tin, for fire material and charring. Strike sparks from the metal tool directly into the tin, which increases the surface area for catching an ember. Once an ember is created, place it into the bird’s nest as described for the bow-drill fire.

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SOLAR FIRE

There is a huge advantage to using a **sunglass** to create an ember. Since the sun is a renewable resource, you are not expending anything from your kit when you use it. All the materials for making an ember can be collected from the wild and are not difficult to use. A sunglass can ignite any char material or either of the fungus species previously mentioned—which can be used in a raw state, often straight from the tree for this method. Horse hoof fungus may work better as a dust, but it will make a nice coal in a short amount of time. You can also create an ember by compressing natural materials like cattail down or poplar barks into a small, tight ball about ¼" in diameter. Then use the glass to burn into the material, creating a smoldering ember.

A WORD ON MATCHES

Matches have been the standby for starting fires for more than 150 years, but they really should just be carried as an extra resource in addition to the three main ignition sources: a lighter, a large ferrocerium rod, and a sunglass. Matches are extremely sensitive to weather and moisture, and you can only carry so many. It would take several boxes of matches to come close to the open-flame power and longevity of a single BIC cigarette lighter. The one small advantage of matches may be the tiny amount of tinder a wooden match requires, but this is negligible in a proper fire lay. Many institutions still teach lighting fires with matches, but I believe this method contributes nothing toward true long-term survivability in the wilderness.

ADVANCED BUSHCRAFT TIP

Most softwood species can be scraped with the back of the knife to create fine shavings for ignition with an open flame or a ferrocerium rod. Inner barks and barks of things like cedar, poplar, grape vine (water vine), and honeysuckle will make a combustible nest if dry. Fatwood is the woodsman's sure fire, and it works well even in the dampest conditions. Fine scrapings and shavings of resinous fatwood pine will ignite easily and burn long enough to catch marginal tinder sources. Birch bark, which contains a volatile oil, will also be highly flammable with an open flame but can be processed to increase the surface area for use with a ferrocerium rod as well. An old Sami method of making fire is to roll tinder in a birch bark tube and then place an ember in the back of this tube closest to the mouth and gently blow. This protects the ember while allowing heat to rise through the tinder and the birch bark. It also adds fuel for longevity once the fire is ignited.

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TIPS AND TRICKS

1. Remember that the bow and drill is a machine; the longer the bow, the fewer strokes it takes to achieve revolutions of the spindle, and the smaller the spindle, the more revolutions per stroke of the bow. There is a happy medium that takes some experience to find. Much is dependent on your own method and body type, but a good standard is to start with a thumb-sized spindle and 3' bow.
2. Always keep an eye out for rocks that may be hard enough to drive a spark from high-carbon tools. Pick up rocks as you are walking and try them. If they work, throw them in your pack; if not, toss them aside. Chert and flint will have a slick shine to it when wet and may be white, gray, or pale hues of red and pink; quartz will always be a good bet.
3. Collect tinder sources at any opportunity, even if just walking from one location to another. Keep an eye out for any hanging, stringy bark materials. Honeysuckle vines will shed thin layers of bark all year long.
4. Dead plants, especially goldenrod, have flammable flower tops and hollow stems. These are terrific sources of tinder and kindling and generally grow in large groves of open fields.
5. A small stub from a used candle is always a good safety device to have when fire starting. Light the candle with the first open flame and set it aside until the fire has become sustainable. If you need a longer open flame for marginal materials, this will save precious lighter fluid. Candles are much easier to make than a new lighter.

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Chapter 5
SHELTERING

"Shelter provides a microenvironment that supplements inadequate clothing or allows you to shed cumbersome layers, especially when you want to stop moving or when you want to sleep in cold weather. Shelter also enhances the effect of a warming fire."

—MORS KOCHANSKI

When planning for shelter you need to consider both long-term and short-term options. Even if you intend to build a base camp with a permanent shelter, you might still need to travel for a night or two to hunt, trap, or fish. For this reason, your kit should include a system that takes you easily from cabin to woods with supplies that will be useful in either situation. The base of this kit will include:

- Waterproof tarp (Egyptian cotton oilcloth works well here)
- Wool blanket
- Simple sleeve of canvas (like a painter's canvas) if you plan to make a raised bed

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THE FOUR Ws

As discussed in detail in *Bushcraft 101*, there are four critical elements to consider when looking for a place to build your shelter:

- **W**ind
- **W**ater
- **W**ood
- **W**idowmakers

WIND

The direction of the wind will have an impact on your ability to safely keep a fire going and heat your shelter. Look for middle high-ground areas where the wind is present but not too strong.

WATER

Look for a nearby area such as a creek bed that can provide a steady source of water.

WOOD

You will need a lot of wood for the fire, building shelter, and making other resources. A large fallen tree provides a good source of firewood, and trees such as pines can provide a steady supply of fatwood.

WIDOWMAKERS

Examine the trees around you—especially large trees—very carefully for any dead branches that could pose a danger to you and your campsite.

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ESTABLISHING A BASE CAMP

Setting up a **base camp** saves you from having to carry all of your supplies on your back at all times. Of course, building a more permanent shelter is a large undertaking, and it will likely take a couple days of work, maybe even as long as a week if you are without a helping hand. Bearing that in mind, the first thing you will need to do when you arrive at the place where you intend to construct your base camp is to build a temporary shelter to keep you until the permanent shelter is ready. Just remember that you need to finish building your permanent shelter before the weather demands one.

For your permanent shelter, you can either build a larger version of your temporary base camp (like a hunter's station) from natural materials, or you can pack a larger canvas shelter in your kit. Whichever you choose, it must have at least three sides for protection from inclement weather and a large fire backing or portable wood stove that is at least as high as the pitch or roof of the shelter. In colder weather a raised bed is a must, but if the weather is fair, a hammock may be enough. Following are tarp configurations that can be used for a roving-type camp, working-camp structures, and finally methods for building a permanent shelter.

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ROVING CAMPS

In *Bushcraft 101* we discussed the most common tarp setups. Here you will learn about some simple makeshift camp convenience items that will make common tarp and other temporary setups even more comfortable.

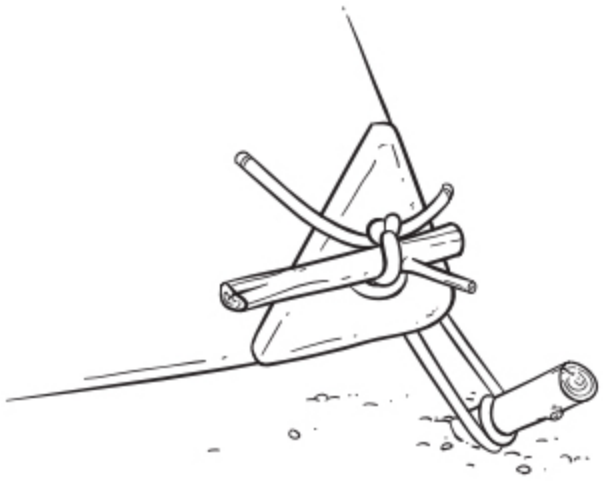
TENTS

There are many types of canvas tents and yurts that can be easily transported as long as you have conveyances. Remember that large canvases can be difficult to heat, so for a seasonal shelter, think about selecting something small. Much of the decision about what type of canvas shelter to use will depend on your environment. **Open-faced tents** like the Whelen provide three sides of coverage and can be used with a hammock. For colder weather I would recommend something that can house a stove like a small wall tent.

Small wall tents can be very comfortable and offer great protection from the elements especially if a stove jack is installed. Many of the gold rush miners lived in wall tents that were placed on raised platforms. These temporary structures were large enough that they could even hold a few small furnishings such as a chair and a small table. Within the wall tent you can easily fit a hammock, a cot, or even build a raised bed. The biggest convenience of the wall tent is that it provides coverage on all four sides, which makes it operate like a canvas cabin. An 8' × 10' wall tent provides plenty of room for one person. It can be used temporarily with all the same fixtures and amenities, such as lighting and sleep setups, that you will eventually use for a more permanent shelter.

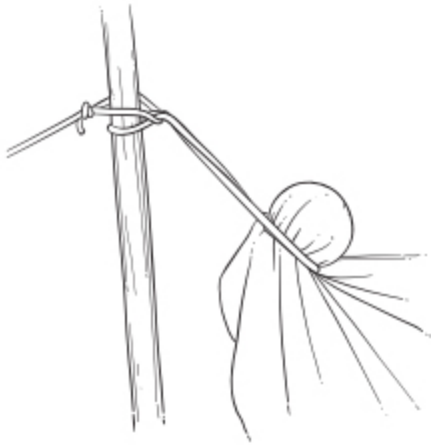
STAKING AND TIE-OUT METHODS

No matter what kind of temporary shelter you use, it will need to be tied down or staked so that it stays secure. There are many methods for securing your shelter, all of which depend on the materials that were used to manufacture it and the environmental conditions in which it has been erected. I recommend staying away from grommets altogether; they seem to be the weakest link in any shelter no matter the material because they tend to weaken the surrounding fabric. Instead, opt for the tie-out or stake loops whenever possible. If you have only a blank canvas with no way to tie it off, place a toggle on the corners and fold it over the toggle; trap this with a jam knot on the corner of the tarp.



A toggle can be used to tie down a tent

You can also use a stone or even a wad of dead leaves to place a ball of sorts in the area that needs to be tied and then tie a jam knot over the whole thing. In the old days, musket balls were often used for this type of configuration.



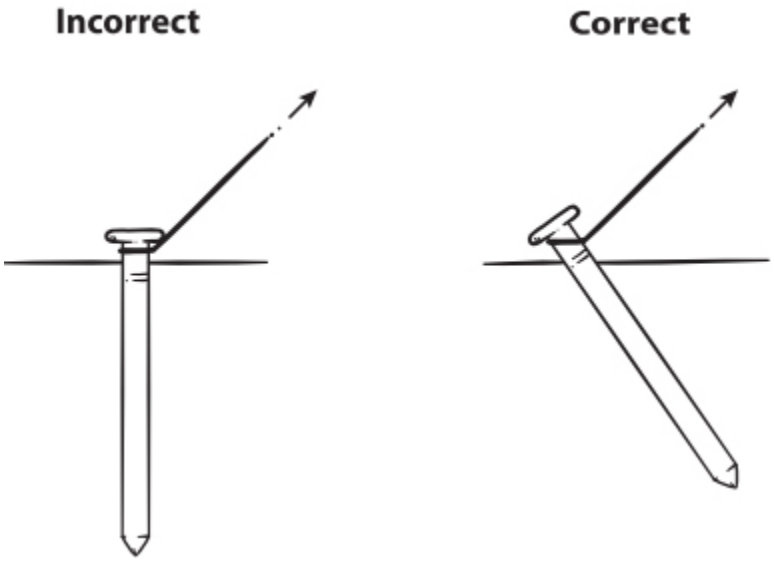
A ball tie-down on a tarp configuration

All tie lines should be made adjustable for tension so they can be tightened or loosened when necessary. Adding this adjustability makes it easy to set up and take down your shelter. To do this, use flat slabs of wood with a hole drilled on each end that is large enough for the ropes to pass through. The rope is then placed in this toggle, one end in each hole, and knotted. If you are using loops for tie-out points, it makes sense to pass the rope through the loop before knotting on one end of this sliding toggle. After this it can be looped over a stake and then adjusted for tension. Another way of doing this is to use a standard trucker's hitch knot with a tensioning loop on the tie-out ropes. You can also use a barrel knot, which will self-tighten when pressure is applied.

Another option is to stake your shelter right into the ground. In this way you are almost creating a microclimate, and wind and weather will have very little effect on it. A noisy, loose tarp that is blowing around in the wind will be an all-night aggravation. Be sure all lines are tight and secure enough to withstand any unexpected weather conditions. Stakes made of wood work well for longer-term camps because the wood swells with moisture, which further secures it into the ground. The length of the stake is

really dependent on ground condition: Use longer stakes for moist ground and shorter stakes for dry ground.

If the ground is extremely hard, you might need to use metal instead. In those cases I recommend fashioning stakes from a ⅜" steel stock like rebar with a 2" × 120° bend at the top. If stakes are not practical at all, you can improvise with things like logs, rocks, or bags filled with something heavy like smaller rocks or dirt. If the ground is extremely soft, it may take a chain of two stakes to secure the tent in high wind conditions.



Stake-driving angles

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PERMANENT SHELTER OPTIONS

The best type of permanent shelter depends on the environment, seasonal changes, resources available, equipment on hand, and the skill level of the user. Here we will discuss a few simple designs that do not require vocational expertise. In my experience, anything that is too difficult or complicated to construct is likely to be left undone.

CAVES AND ROCK HOUSES

Long before man started constructing his own shelter he adopted existing elements in nature to be his home, just as animals do. These caves and stone shelters endure in nature, and although it takes a little effort to make them comfortable, they can still be a great choice if the situation arises. In fact, there are millions of people worldwide who live in cave dwellings.

THE DOWNSIDE OF CAVES

It is important to remember the dangers that may present themselves in natural dwellings.

A wet cave can be a miserable place to sleep. If you are in an area with high humidity or lots of annual rainfall, caves are not the best choice. Cave moisture creates several dangers, including bacteria growth, mold, weak stone integrity of the cave itself, and a dampness that could leave you cold most of the time. A cave might also already be home to insects and other mammals such as bats, cats, or bears.

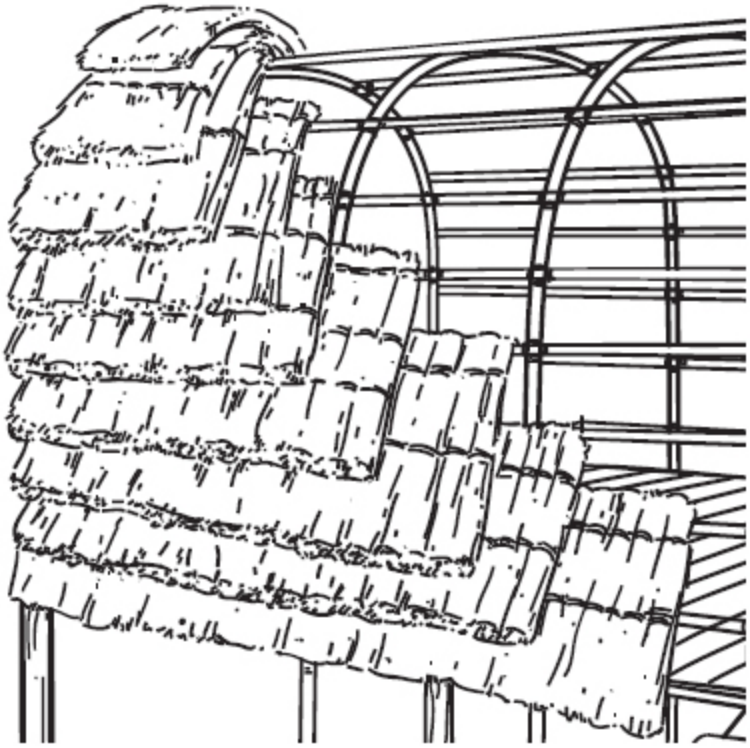
BUSHCRAFT TIP

If you are considering using a cave as a permanent shelter dwelling, inspect it for signs of animals that may have set up housekeeping. Look for feces, bones, and smells of urine.

Falling rock can also present a danger, so make a visual inspection with a good light source of the ceiling and walls. Look for fissures or cracks in the stone that might be compounded by heat from a fire. Consider the height of the ceiling. The lower the ceiling height of the cave, the more a fire will affect the structure’s integrity. Caves with higher ceilings will also provide much better ventilation.

RAISED PLATFORM SHELTERS

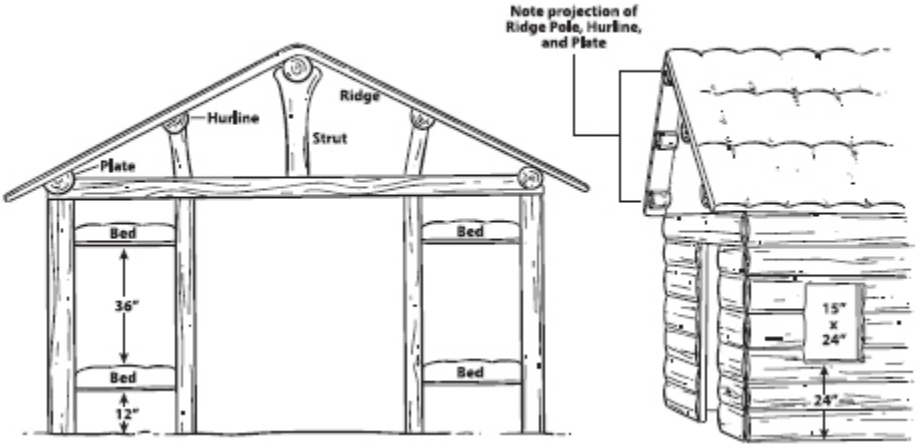
A raised platform shelter can be constructed by attaching wood pieces with simple lashings and cross members to create the platform. Just remember that the more complex the shelter, the more resources and tools that are required to construct it. The raised platform should be at least 3'–5' above ground level; again, this depends on the factors like wildlife, resources, and environment. Make this platform at least 2' wider than the inside dimension of the shelter you plan to place on top of it and at least 6' longer to leave room for open work areas. The covering or construction of the shelter itself can be a simple hoop design or a square structure. The hoop design is by far the easiest to build and maintain, and it will shed water the best as well.



Hoop design on a shelter configuration

LOG CABINS

Building a small cabin with a single pitched roof is a fairly simple undertaking from a design perspective. However, it is labor-intensive and requires a great deal of timber resources. An 8' × 10' cabin should be sufficient for a single person. Anything larger will be difficult to heat. You will want logs of at least 8"–10" diameter for this, and size will dictate the number needed.



Basic log cabin design

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EARTHEN STRUCTURES

Shelters constructed from earthen materials are a good option if the resources are available. Partial wood construction shelters can also be covered with earthen materials for far better insulation in cold-weather environments.

SOD

Sod is slabs of ground materials and dirt to which the existing plants or grasses are still attached. Sod makes good shelter coverage because it should continue growing foliage over time, which will only add to its waterproofing and insulation capabilities. Sod can be cut to any width and length but should always be at least 4" thick. If you intend to use sod materials on a roof, ensure that the supporting structure can hold the weight before covering. You will want semiclear sod that does not contain small trees or bushes, which may later grow large roots that interfere with the rest of the structure.

NATURAL CEMENTS

Natural cement has been used for thousands of years to build many things from shelter structures to hearths, ovens, and storage areas. You can even use natural cement to develop your own blocks or bricks.

The following materials are required to make natural cement:

- Clay-based soil (if the soil feels smooth and slick when wet, it most likely has a higher clay content)
- Grasses and longer fibers that can be used as rebar
- A source of water
- A bucket or container for mixing

To make the cement, collect enough clay-based soil to fill your bucket. You will also need a good armload of dry grasses about 6"–12" long or other fibrous plant materials. Long, dry grasses work much better than green grass for this project.

Now mix some water with the clay until you get a squishy consistency that is not too runny. If you are using this for a mortar or chink, mix it thinner. You can mix the cement right in the bucket, but I find that a tarp works very well for this process. Spread out the tarp, lay down the grasses first, and then dump the mud on top of them. The most effective way to incorporate the mix is with your bare feet so that the materials really grind together. You can fold the tarp over the materials and walk on the enclosed mass, or you can simply use your hands to make sure the grasses are well mixed and nothing is left dry or unmixed.

Use the cement immediately to create your structure or as mortar for your project. If you want to save it for later, you can shape it into bricks.

BUSHCRAFT TIP

To make bricks you can use the cement already created and shape it in a form made from wood. It will take several of these forms to make many bricks at a time. Pack the materials into the brick form and use another split stick as a scraper to level the top. Let the bricks dry in the sun for several days and they will shrink a little bit, making it very easy to remove them from the mold. You can also make fired bricks similar to the way you make clay pots, but the binder material used must be more selective, like cattail fluff or crushed shells.

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CAMP AMENITIES

No matter the size or permanence of the base camp you decide to construct, there are a few camp amenities you should include for both comfort and convenience.

LIGHTING

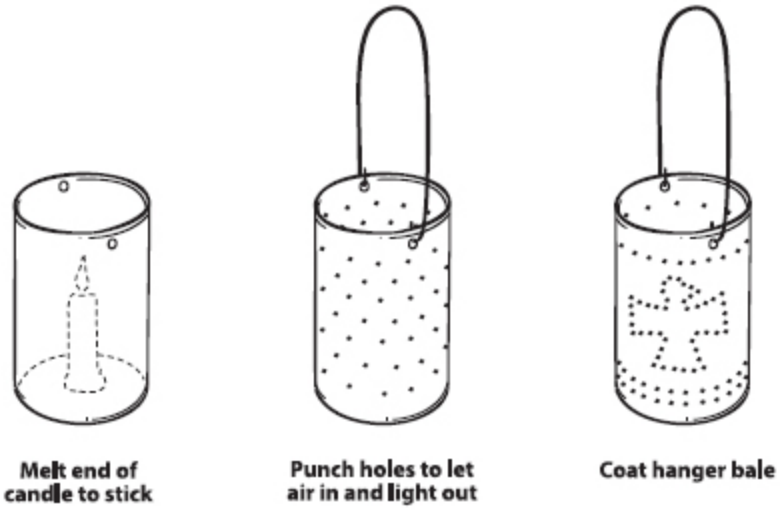
You need to think about sources of lighting to use as the fire dies down or before the fire is built. Headlamps are fine for a quick outing as long as your kit includes spare batteries. For the long term, candles tend to work best. Besides providing light, candles also have an open flame to aid in emergency or late-night fire starting. Beeswax candles can also be melted and used for many other purposes such as a lubricant or wood polish. You can even rub it on your tools to prevent rusting.

A simple **lantern** can be fashioned from an empty can to protect the candle from going out in the wind. If your hunting or trapping campaign has been successful, use fat from the animal to make oil lamps. Any concave container, from a shell to a hollow piece of wood, will make an easy lamp. All you need is a wick, which can be made from any soluble material such as cotton rope or natural cordage. You can also use a ball of compressed cattail fluff or corded cedar bark for a quick, temporary wick.

Make **candles** by dipping a wick of natural cord into a pan of melted tallow, letting it cool, dipping again, and letting it cool. The thickness increases each time. The difference between tallow and lard is the tallow will harden at room temperature and lard will stay soft. Torches are easily made by dipping dead plant tops like mullein into fat and letting them dry.

SOAP

Many plants have natural **saponins**, chemicals that are created by the saponification process when making soaps. This substance occurs naturally in many plants and creates a nice lather that can be used as a natural soap. In the eastern woodlands, the best choice for this is the bracken fern because its root is high in saponins. Yucca is another American plant that can be used for this purpose.



Simple lantern made from a can

LATRINE

For short-term outings it is easy to simply walk away from camp and dig a small cat hole for a latrine. Outings that last more than a couple of days, however, will necessitate a pit latrine. This pit must be a comfortable distance from camp but well away from any groundwater source. Generally speaking, the **pit latrine** should be as deep as possible but should be kept to at least 3' above the water table. Finding a spot this far above the water table can be a tricky undertaking depending on camp location and elevation. If you find yourself needing to choose between a farther walk and possible groundwater pollution, do yourself a favor and take the walk up hill. A

good practice for wilderness pit latrines is to add ashes from the campfire daily. This will cover the smell, break down the fecal matter, and detract pests like flies. Once the pit is full within a foot of the top, cover it with debris and dig a new pit in a different location. Consider this matter seriously at the outset when choosing a long-term camp location.

LINES

Ridge lines are the best place to hang a lantern, keep clothing off the ground, or suspend a bag of goodies that may be needed at night. Drying lines should always be used to ensure you have a place to air bedding material and clothing during the day or when wet. Beating a wool blanket hung over a line will keep it free of dirt, dead skin cells, and many pests.

ESTABLISHING A SLEEP SYSTEM

Sleeping gear can have a big impact on the weight of your supplies—a simple canvas and a couple of wool blankets can add as much as 20 pounds to your kit. Still, a good night's sleep of at least 6 hours is one of the most important aspects of long-term comfort and survival. Often my sleep system makes up two-thirds of my kit's weight. The following items are a solid basis for a sleep system that will be effective in either a temporary or permanent shelter:

- Wool blanket (or two)
- Materials for a raised bed
- Canvas
- Large needle, like a sail needle, that is heavy enough to puncture your canvas
- #36 bankline for stitching the canvas

- Synthetic sleeping bag in case you are not able to return to the base camp for a night or two

BUILDING A RAISED BED

A **raised bed** is the best weapon against ground temperature when sleeping. You can manufacture a simple mattress, or browse bed, with a heavy painter’s canvas or wool blanket. First fold your canvas widthwise (not lengthwise). It is okay for your feet to hang off the end, but it is important that your bed be wide enough for you to roll over without falling. Thread your needle with the #36 bankline and whip-stitch the ends of your canvas together on two sides. The stitching does not have to be perfect; anything between 1"–2" stitches will work fine. It should not take more than about 15 minutes to stitch up two sides of the canvas.

Next stuff your bed with leaves and grass. This is the most time-consuming part of manufacturing a raised bed. Stuff the bed and then compress the material to make room for more. Stuff the bed again and compress the material to make room for more. This process can take as long as an hour. When the bed is packed with about 4" of compressed insulation, stitch up the last side with your whip stitch.

SETTING UP YOUR SLEEP AREA

Fold over your tarp and lay it down where it will act as a moisture barrier between the ground and your raised bed. The wool blanket will keep you warm while sleeping. Carry some sort of bag—even your haversack—that can be emptied at night and filled with spare clothing to act as a pillow. A pillow is a tremendous comfort that is often completely underrated.

HAMMOCKS

Hammocks are an option but will require an underquilt or some sort of insulation to battle convection issues that come with colder weather. A cheap way to deal with this issue is to place a thick pad like a ground mat in the hammock and a reflective batting on top of that. Then place your sleeping bag or blankets right on this pad. Reflectix is an insulation used for the home and can be purchased at any hardware store. It comes in 2'–3' widths and is basically a bubble wrap with Mylar covering. The other option is an underquilt that will trap warm air between the quilt and the hammock.

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TIPS AND TRICKS

1. There are many good, modern synthetic materials you can use as a sleeping bag. Just remember that these materials will not be as long lasting over time and are much more susceptible to things such as an errant spark from an all-night fire.
2. Canvas that is untreated may be susceptible to mold. Treating it before use with a guarding agent is prudent. Canvas can also be very susceptible to UV breakdown at altitudes of about 3000', so treat it or buy Sunforger tent canvas, which will be the best bet for a long-lasting shelter.
3. Most red-meat animals have tallow in their fat, and most white-meat animals like hogs have lard.
4. In areas where stakes will not penetrate hard earth or rocks, long logs or large rocks can be used as substitutes for stakes.
5. Remember that any insulation made from natural material on the ground to battle conduction should be 4" thick when compressed.

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Chapter 6
KNOTS, BINDINGS, AND LOOMS

"Bushcraft is what you carry in your mind and your muscles."

—RAY MEARS

Cordage is one of the most valuable resources that you carry in your kit. Its uses are endless, from lashing objects together in woodworking projects to weaving additional implements to add comfort to your camp.

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CORDAGE AND ROPES

For long-term excursions, here are the most beneficial and multifunctional ropes and materials to carry in your kit:

1. Natural ropes
2. Paracord
3. Bankline
4. Natural strings
5. Webbing
6. Mule tape

NATURAL ROPE VERSUS SYNTHETIC ROPE

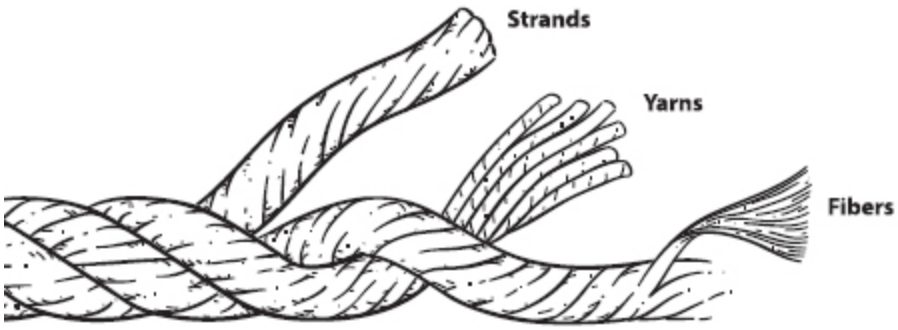
Natural rope is easier to use and far more versatile than most synthetics. This is true especially when it is broken down into smaller fibers or cords. Synthetic ropes, such as rigging rope or Kevlar climbing and static-line ropes, are widely available and can be a good resource to keep on hand if you have room in your kit. Just know that while these synthetics are strong for their relative size, the fibers tend to break down after lengthy exposure in the wilderness, which makes them difficult to use.

MAKING ROPE

Making rope is a useful skill to possess in the event you find yourself in a situation that requires more cordage than what you currently have in your kit. You can make a rope by combining and twisting three or more strands together. There are three components to a rope:

- **Fibers**: The fibers are the smallest materials that are twisted together to create the yarns.
- **Yarns**: Yarns are multiple fibers twisted together in the same direction.

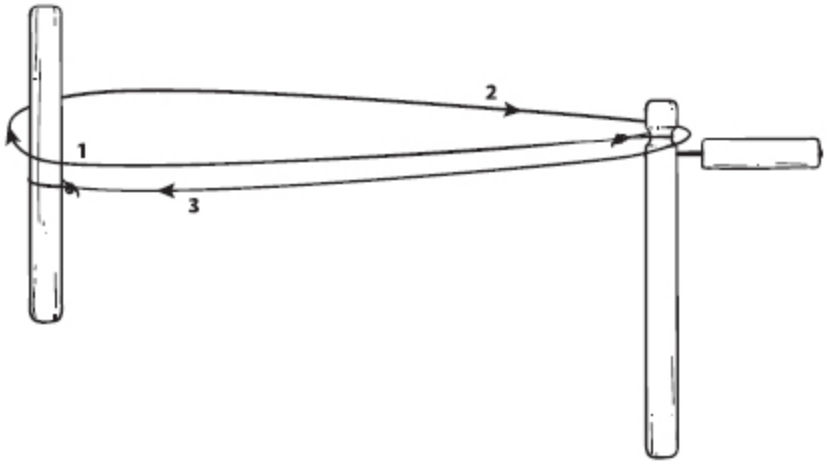
- **Strands**: Strands are multiple yarns again twisted in a single direction.



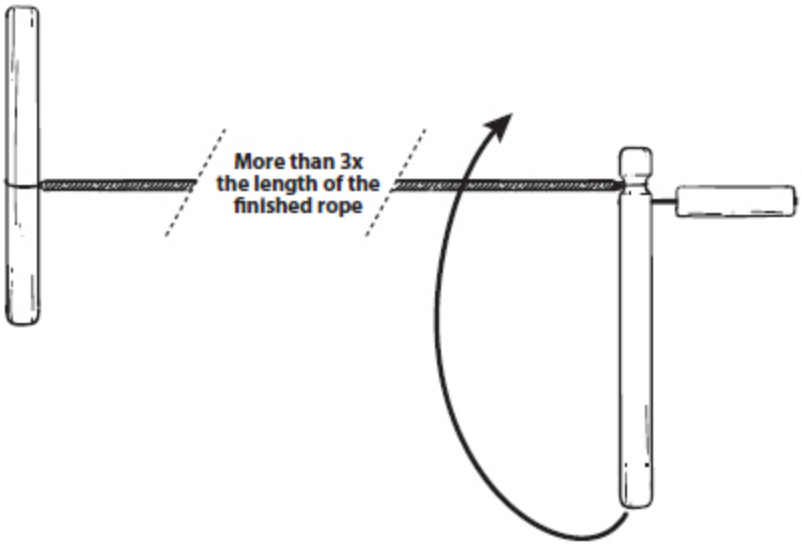
Rope components

OPERATING A ROPE TWISTER

Rope is made from multiple strands twisted in two different directions. It only takes one person to operate a simple rope twister, which can produce lengths of rope that are about 20' long. To make enough, you will need to feed about eleven times the amount of cord you intend to produce through the rope twister. Attach one end of the cord to a stationary object and make one loop so that you can attach it to the spinner and twist. Start by spinning in a clockwise fashion until the cord begins to wind on itself when it is slack. At this point, divide the cord in thirds and make two loops: one to place over the original stationary object and one to place around the twister. You should now have three strands of larger cord again between the twister and the static end. Begin spinning again in counterclockwise fashion until the desired tightness is achieved. Once the rope is finished, pull hard against the static object to “set” the rope. Cut the ends and whip-stitch them to finish your rope.



Step 1



Step 2

CONSERVING CORDAGE

One of the most important skills in wilderness survival is **proper use of cordage**. Whether it is synthetic rope you have carried in your kit or natural rope you have manufactured yourself, cordage is a precious resource that should be treated with care. In fact, I prefer to use knots that can easily be untied so that the rope can always be recovered without having to cut it.

When working with synthetic rope, I also avoid cutting lengths shorter than about 20', or four “pulls” from the roll, unless it is absolutely necessary. By “pulls” I mean pulls from the roll that are the length of my outstretched arms, from one hand to the other. For this reason, it is always best to use natural bark cordage for small binding or lashing projects.

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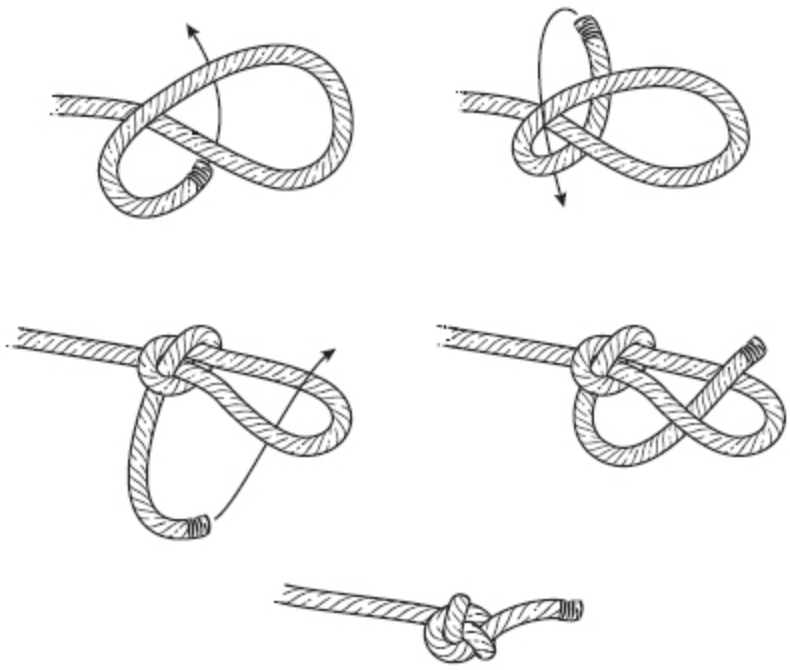
KNOTS

Bushcraft 101 covered some basic knots (bowline, fisherman's, Prusik, timber hitch, clove hitch, and trucker's hitch) that you need to know when setting up a short-term camp. Understanding how to make joining and jamming knots and knowing when to use them will help you conserve cordage and ropes on a long-term excursion.

STOP KNOTS

The **stop** knot is used as a security knot in conjunction with jamming and joining knots. Both joining and jamming knots are used to join two cords or ropes together to increase cordage length. A stop knot is an overhand knot that is tied to keep the line from slipping under tension, passing back through a hole, or even slipping through another knot.



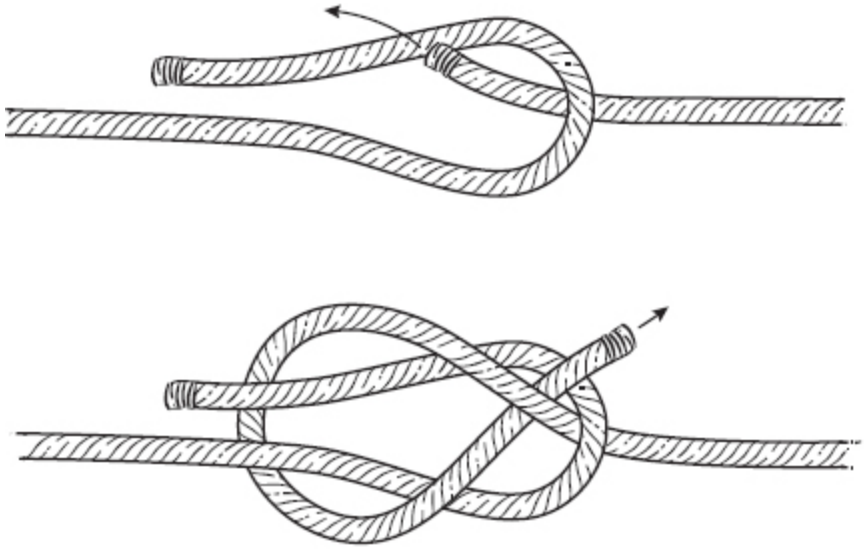
Stop knot

JOINING KNOTS

A **joining** knot is used to connect two different pieces of cord that may or may not be of the same diameter.

Sheet Bend

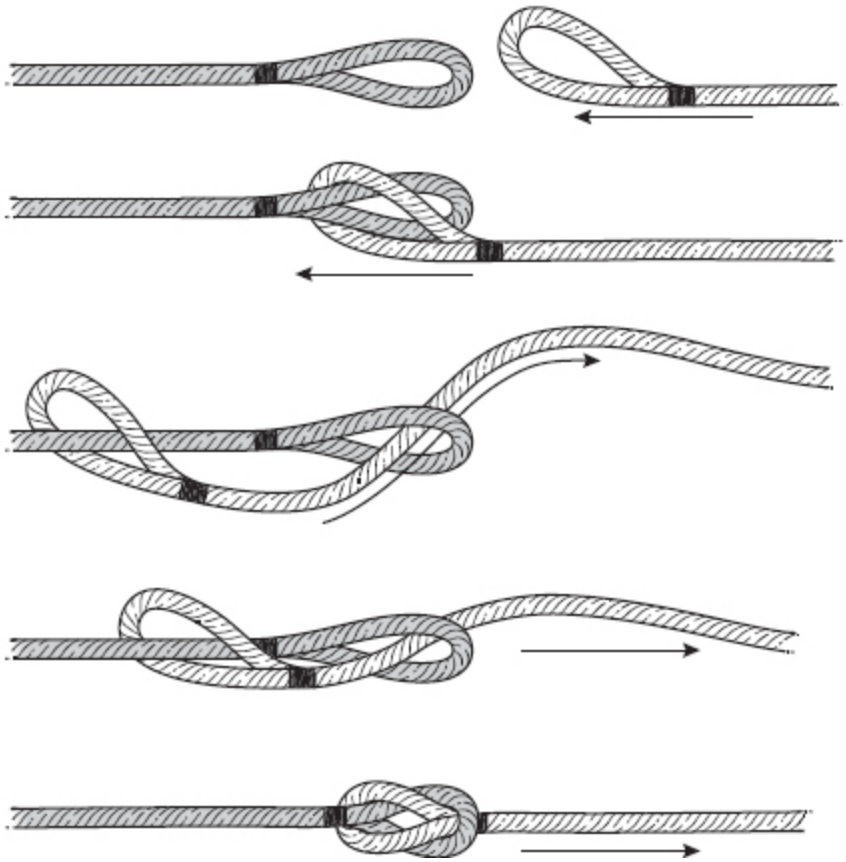
The sheet bend is a great knot for joining two ropes of equal diameter when loops are not available on the end of the lines.



Sheet bend knot

Loop to Loop (Square Knot)

The loop to loop is generally useful when joining lines with loops on the end of both lines.



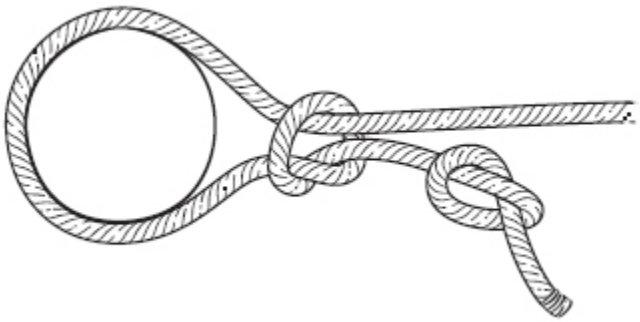
Loop to loop

JAMMING KNOTS

A **jamming** knot is used to join two pieces of cordage of the same diameter together, especially if the line to be extended has a loop on the end. The beauty of these knots is how easily they can be loosened for adjustment or removal on the fly or in a hurry.

Canadian Jam (Arbor Knot)

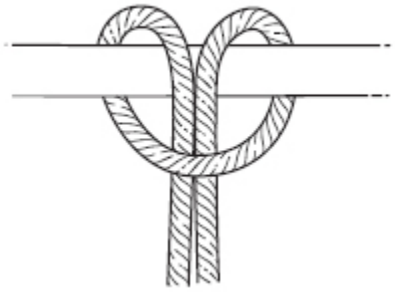
The Canadian jam is best used as a tensioning knot when cinching a load such as a blanket to a frame or a bedroll. This knot can also work for things like tensioning two cross braces on a raft.



Canadian jam

Lark's Head Jam

This knot works very well when attaching cords to a line for the purpose of weaving or hanging something from them. You can even use this type of knot for toggles when you are not able to double over the line or when you simply need to hang a single line. It is best used with a stop knot on the tag end.



Lark's head jam

Clove Hitch Jam

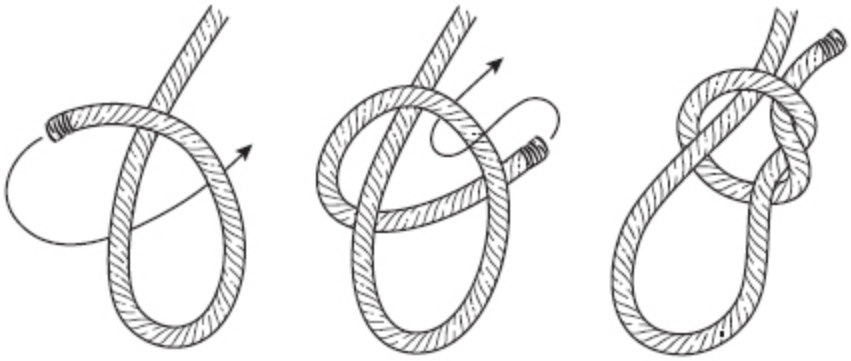
The clove hitch jam is a knot that will actually cause a constriction to the attached line to keep the tails from sliding independently. Essentially this knot self-locks under tension.

IN-LINE LOOPS

In-line loops are for a static hold or connection but can also be used as a static pulley for tensioning around an object.

Slip Loop or Hitch Loop

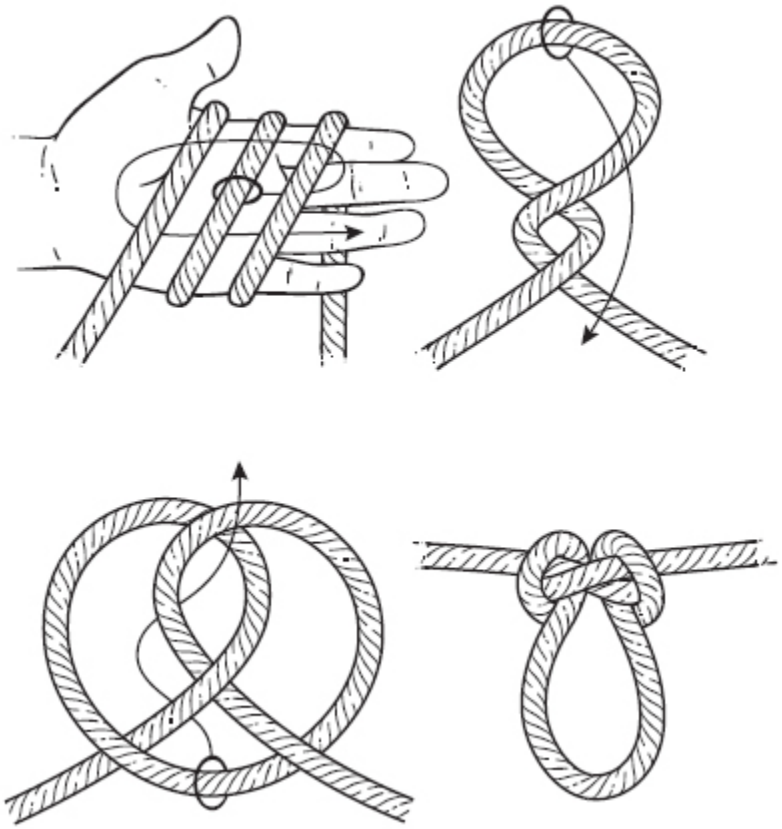
The slip loop is used to make a tension device, kind of like a pulley. It is used for things like holding loads tight or pulling a ridgeline taut. The slip loop can be easily incorporated into the standing line and comes undone with a simple pull.



Slip loop

Butterfly Loop

The butterfly loop will form a stable and secure loop that does not slip within a line. This knot can be easily broken or untied even when it is under tension. You can also easily adjust the size of the loop.



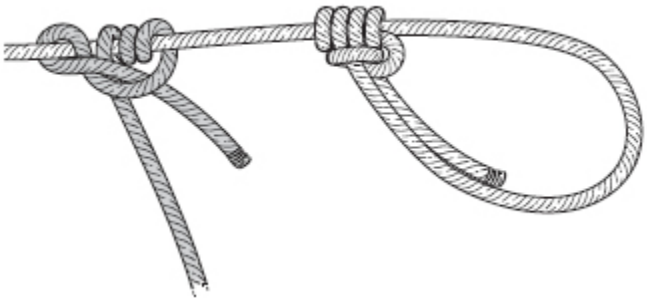
Butterfly loop

SLIDERS

Sliders are defined as knots that will slide up and down a static rope, tied on itself, or knots made by attaching one rope to another.

Barrel Knots/Blood Knots

Barrel knots can be used on one side of a standing or looped line to create a slider that can be adjusted for tensioning guy lines. If it is tied on two opposing lines, it becomes a joining or blood knot. The blood knot is often used for monofilament or fishing lines.



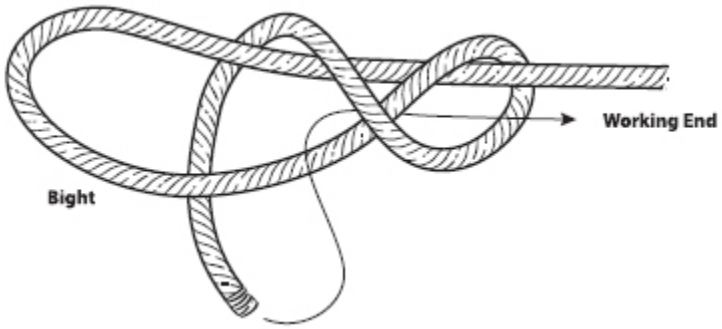
Barrel knot

END-OF-LINE LOOPS

These knots are simply used to create a loop tied in one end of a line or rope. This can be used as an attachment point or a tensioning loop around an object as when you are putting up a ridgeline around a tree.

Poacher's Noose

The poacher's noose is a specialty knot used for snaring that incorporates a lark's head loop on the end of the snare loop so that it will constrict and stay tight under tension.



Poacher's noose

Figure Eight

Figure-eight loops create end-of-line loops that are easily broken or untied after tension is applied to the loop. These loops work much better than a simple overhand knot to create end-of-line loops.

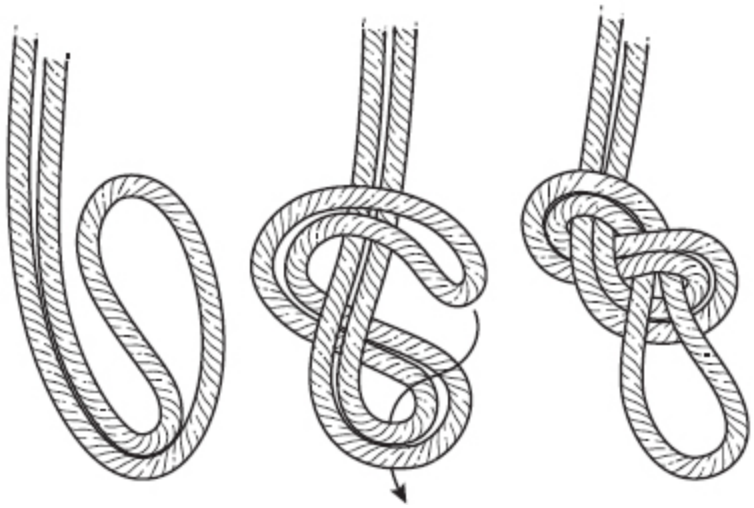
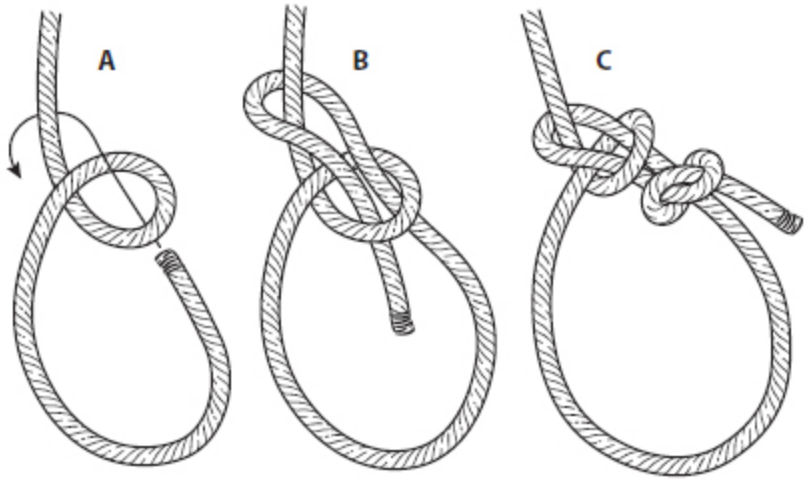


Figure eight

Bowline

The bowline is another end-of-line loop that has a few advantages over the others. For one, it tightens or constricts against the line as tension is applied, which makes it a good rescue loop. It can also easily be tied into the line after the rope is already passing around another object.



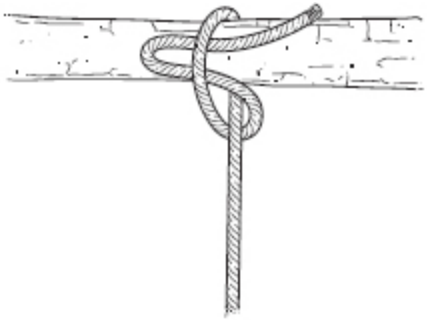
Bowline

HITCHES

Hitches are generally temporary connections that can be easily untied or adjusted.

Slippery Hitch

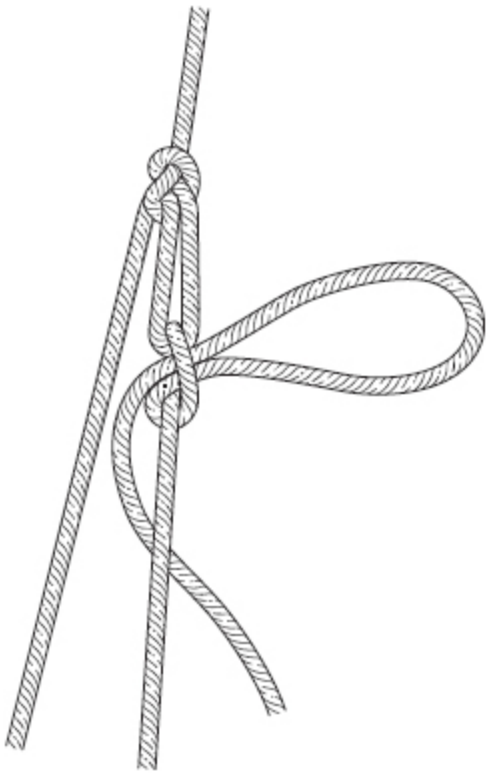
The slippery hitch is a quick hitch to secure objects that are not under a load. It could be used when hanging a cord from another line or a branch. It is a quick-release knot so it is especially helpful for things such as tying a line from a boat to a tree on the shore.



Slippery hitch

Trucker’s Hitch

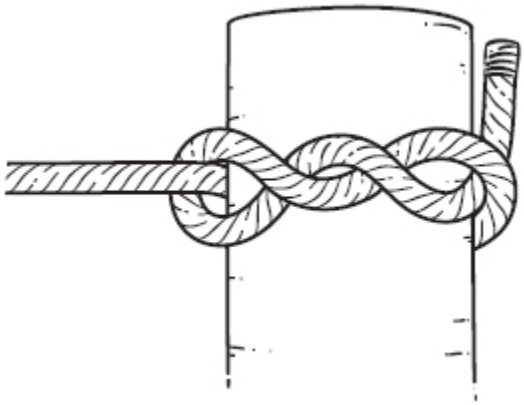
The trucker’s hitch incorporates an in-line loop to secure a load or a tensioned line. It can be set up to quick-release so that loads can be easily untied or so that ridgelines at the campsite can be easily moved.



Trucker’s hitch

Timber Hitch

The timber hitch is a great starting hitch for any lashings because it is a constricting knot that relies on friction in order to hold. It can be easily undone to recover cordage and can be used at the end of bowstrings.



Timber hitch

BINDINGS

Bindings are a combination of wraps, knots, and hitches that are used for securing something. They can be used to secure loads that will be transported over a distance or to secure a series of contents rolled into a package such as a tarp or blanket. They can even be used to attach a bundle to something else such as a pack frame, horse, or sled.

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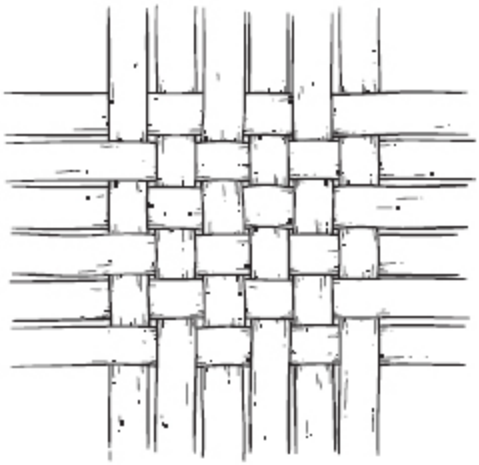
BASKET WEAVING

Baskets make excellent containers for storage and carrying food while you harvest it. The simplest method of basket weaving starts with making a cross lashing in a square-lash fashion with four flexible twigs, shoots, or splits on each side for a total of eight sticks. You will need to add a ninth stick into this as you begin to weave your basket. You can weave in any material such as vines, bark, or splits. Weave in and out of the splits. You can start to shape this weave into a basket by gradually lifting the sides and controlling the tightness of the weave to form a round container. Finish this off by wrapping another piece of the material in an overhand running-stitch fashion around the top and trim any excess sticks or twigs off the finished product.

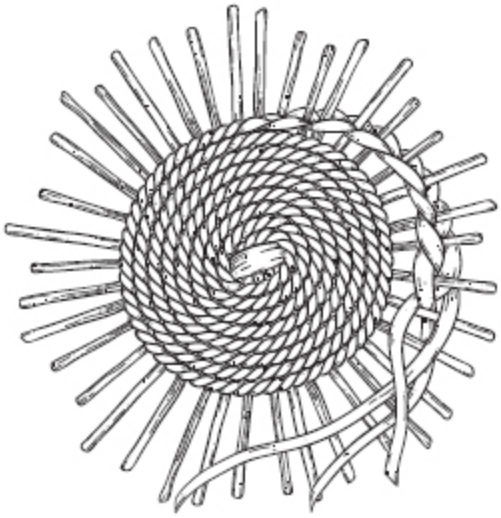


Basket weave

SIMPLE COIL BASKETRY

Coil basketry is a simple skill that employs pliable materials to make containers. It takes a good amount of cordage to sew a coil basket—especially a large one—but the materials used to make the coils are quite

simple. Choose items that can be doubled in half without breaking, such as pine needles and other leaves. Then you will need some bankline and a shuttle or a needle. A large sail needle works very well here, but you can also make your own out of wood or bone. Start with a section of the material you plan to coil. Double it over and wrap it into a tube, and then make progressive coils in a circular fashion, wrapping or sewing with the bankline to hold them together.



Coil basketry

BARK BASKETS

Bark harvested from the yellow poplar in the spring can be fashioned into a durable basket. Yellow poplar bark can also be manipulated into tubular shapes and used for quivers. To harvest the bark, score the outer bark of the tree down to the sapwood with a knife or axe. Then score another line in a circular fashion above and below that first line. This method, known as “ringing the tree,” will usually kill the tree, so take care to select a poplar with a lot of other resources that you can use over time.

Once the bark is scored you can use a sharp stick or spud to peel it away from the tree. For a simple basket, cut a piece of bark that is two-and-a-half times longer than the finished basket needs to be high. Select a width based on the size you want your container to be when it is complete. Cut two half-moons on the outside of the bark right in the middle of your piece. The half-moons should be facing each other so that their bottom and top tips are touching. These cuts will be the fold lines that form the bottom of the basket. You can then fold up the sides and lace them. Fold up the piece with the bark facing out, and drill holes up the sides using your awl. You can use strong cordage to lace up the basket with simple x stitches. Add a handle to the top if needed. Yellow poplar is my favorite for this, but you can also use birch. If you plan to only make a very small container, maybe you can avoid stripping a large section of bark. In these cases, place a coating of mud over the open area of the tree to help protect it and give it a chance to heal.

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WEAVING

Weaving is broad skill that can produce anything from straps for a backpack to baskets or even shelter coverings. It can be as simple as weaving together small strands of cordage or as complex as using a loom to weave threads into a wide textile. In this section I will describe some of the most versatile weaving techniques that have served me well in wilderness outings.

Before we get started, here are some terms you should know:

- **Crosshatch**—Two series of parallel lines that flow in opposite directions so that they cross each other.
- **Warp**—The set of lengthwise threads on a loom.
- **Weft**—The thread that is drawn through the warp threads to create a textile.
- **Shed**—The separation between the upper and lower warp threads through which the weft is woven.
- **Heddle**—The part of the loom that separates the warp threads so that the weft can be threaded through them.
- **Shuttle**—Anything that will carry the weft across the warp and through the shed.

DIAGONAL FINGER WEAVING

Diagonal finger weaving is an effective technique to make short straps that can be used for things such as backpacks, gun slings, or other projects that are not particularly long or wide.

To get started, place two nails about 6" apart in a piece of stationary wood such as a workbench. Your weaving stick will rest on top of these nails while you work. Select a weaving stick about ½" in diameter and 12"–16" long. Double 5 strands of cord, such as jute string, over the weaving

stick and secure each cord with a lark's head knot. You will then have 10 strands hanging off your weaving stick.

Use a second stick, similar in diameter and length to your weaving stick, as a **winding stick** to be placed below the two nails that are holding your weaving stick. Wrap finished product around the winding stick as you weave. This allows you to stay close to your work area and use the tension created as the weaving stick rolls against those nails to create a secure weave.

Now it is time to get started. Set your weaving stick on top of the nails. Loop the tenth strand over the right-hand nail in your workbench. For the first row, take the first strand, which will be your active strand, and loop it under the second strand, over the third strand, under the fourth strand, over the fifth . . . and so forth until you reach the ninth strand. Then take the tenth strand off the nail and replace it with your active strand.

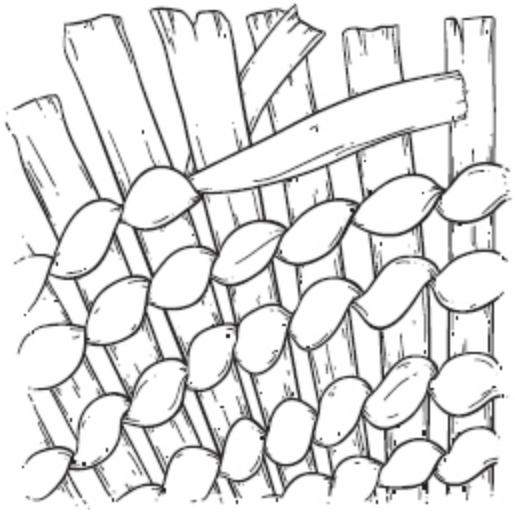
For the second row, take what is now your first strand and loop it, this time over the second strand, under the third strand, over the fourth strand . . . and so forth until you reach the ninth strand. Pull the tenth strand off the nail and replace it with your active strand.

Continue this process, taking the first strand in the line and alternating the under/over weave and then switching that pattern in the next row to the opposite, until your piece reaches the desired length. At this time, take your tenth strand and fashion it into a clove hitch to finish the strap.

CROSS WEAVING

Cross weaving is a process that can be used with any textured material like barks or cattail leaves. Cross weaving involves hatching and can be used to make materials as large or as small as you need. It can also be shaped into almost any configuration needed. Picture a tic-tac-toe board in

which the lines of the board alternate over and under each other to form a weave.

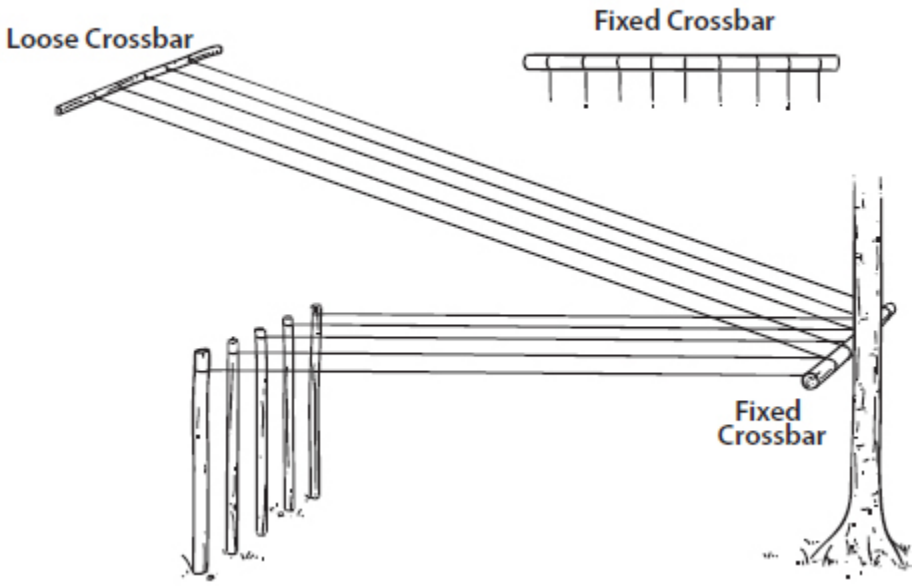


Cross weaving

WOODLAND LOOM

You can manufacture a large-scale **woodland loom** as a means for creating big sleeping mats or covering for shelters like wigwams. To make a woodland loom, secure one long sapling about waist high on a tree in a T fashion with a simple lashing. Place several stakes in the ground away from but directly in front of this crossbar. These stakes are your looming poles and should be lined up parallel to the tree. The longer the project, the farther the stakes should be placed. The width of your project will be determined by the number of stakes in the row. Then create another bar from a similar-sized sapling as the one you used for the T. You now have the components of your loom. You will then alternate the warps for the weave with strong cordage. Alternate so that the first warp is fixed to the sapling you secured to the tree. The next warp is secured to a stake. The next warp is secured to the sapling on the tree. The one after that is secured

to the next stake in the line. Continue setting up the warps in this pattern until you reach the final stake. Use the crossbar as your heddle. Once the warps are complete you will be able to raise and lower the heddle to place wefts of material in the loom, alternating over and under them. Use another sapling as a beater stick to tighten the wefts as you go. This operation works best with more than one person.



Woodland loom

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TABLET WEAVING

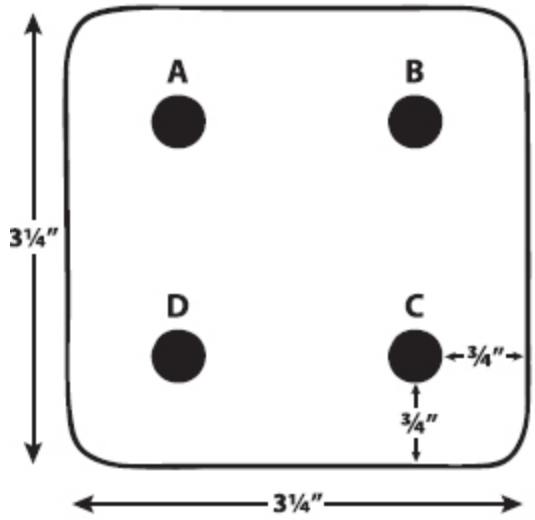
Tablet weaving, like diagonal finger weaving, is used to make straps that are strong but not too wide. In tablet weaving, however, you will not be manipulating the individual components of your project as much because you will not be using your fingers. In tablet weaving, cards, or flat pieces into which holes have been drilled, operate as the shed.

To begin, you will need to create an even number of square cards that are about 3¼" on all sides. For this you can use wood, cardboard, plastic, or any other material that is fairly stiff. Drill 4 holes, one in each corner, in each of your cards. These cards will act as the heddle, and one thread will pass through each of the holes to create the warps. So if you have 12 cards, you will have 48 warps.

The loom can be any two points such as sticks, for example, to which you can attach your threads. When you begin weaving, you can either hold the end of the loom that is nearest to the cards or attach it to your belt. The far end can be secured by a slipknot to a stationary object like a tree. Once you determine the number of warps, it is time to cut your string. Take the number of warps and cut half that many strings. If you want 48 warps, cut 24 strings. Fold each string in half and secure to the near end of your loom with a lark’s head knot. Once all the strings are attached, you can now thread each through the holes in your cards.

Once the warps are established you will need a shuttle to pass the weft through them. A net needle will work perfectly, or any needle that has an eye big enough to hold your cordage. To begin weaving, pass the shuttle through the shed, which is the gap between the top holes in your cards and the bottom holes. Once you reach the end of the line, turn your cards a quarter turn clockwise. Now pass the weft through the shed once more and,

once you reach the end of the line, turn your cards another quarter turn clockwise. Repeat these steps until you reach the desired length. To finish the piece, simply tie off and braid the remaining length of strands.



Tablet weaving

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A SIMPLE PEG LOOM

Simple **peg looms** are useful because they can be adjusted to work with materials of all sizes to make products of all dimensions. For the sake of our instructions, assume we are using wool yarn to make a scarf. When weaving with a peg loom, the string threaded through each peg is the warp. The yarn wrapped around each peg is the weft.

CONSTRUCTING A PEG LOOM

To build a peg loom you will need the following materials:

- 1 piece of wood: 2" × 4" and about 1'–2' long
- 8 dowel rods about 1" × 6"–8"
- A drill

Drill a series of holes into your 2" × 4" into which each of your dowel rods will sit. These rods are your pegs for the loom. Drill a hole at the base of each peg through which you will thread the warp strings. These holes should be high enough that when the pegs are placed in the holes on the 2" × 4" you can see them above the edge.

SETTING UP THE PEG LOOM

Determine how long you want your final product to be and use double the amount of cordage. Now thread one piece of yarn through each peg. I use a small wire hook to help pull the string though the peg holes. Pull the yarn through until both sides of the yarn hang evenly from the peg hole. These hanging yarns will operate as the warp.

Now that your peg loom is set up, it is time to begin weaving. Pull the tail from your ball of yarn (or whatever material you are using) and tie it to your first peg. Use an overhand knot that is secure and will not come

undone. Pass the yarn behind the second peg, in front of the third peg, behind the fourth peg, in front of the fifth peg, behind the sixth peg. Now bring your yarn back to the first peg by passing it in front of the sixth peg, behind the fifth peg, in front of the fourth peg, behind the third peg, in front of the second peg, and in front of your first peg. Now send that yarn back down the line of pegs. Each row of wraps you make around the pegs will essentially lock in the previous row of wraps because they will wind in the opposite direction.

Continue passing the weft around the pegs until your stacks of wraps are about three-quarters of the way up your pegs. As you weave, push down the rows of wraps with a beater stick or your hands. This not only tightens up the rows on your work but also allows you to fit more rows on the pegs.

BUSHCRAFT TIP

You can expand your peg loom so that it will work with projects and materials of all sizes. Simply drill an additional series of peg holes above and below your first row. The holes can be farther apart for wider materials or closer together for smaller cordage. Make the holes bigger for bigger pegs or smaller. The larger setting in your peg loom can be used for shreds of animal hides. Peg looms can have as many as 30–40 pegs, depending on the width of your materials and desired size of your finished product. You can place such large looms on sawhorses for stability.

I like to tie a slipknot in the bottom of my hanging yarns to make sure that my weaving holds together as I unload the pegs. Pull the pegs out of their holes and slip each stack of wraps off the pegs and slide them onto your hanging yarns. Put the pegs back into the holes and wrap the yarn

around them again, alternating directions, until they reach about halfway or three-quarters of the way up the pegs. Once more, slip them off the pegs and slide them onto your weft. Continue doing this until the piece reaches your desired length.

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INKLE LOOM

An **inkle loom** is a tape loom that can be used to make narrow pieces such as belts, trim for clothing, haversack straps, and sashes. Constructing the inkle loom is challenging, but once set up and threaded, weaving on the loom is very straightforward and simple.

CONSTRUCTING AN INKLE LOOM

To make an inkle loom you will need the following materials:

- 1 (30" × 1" × 4") piece of wood
- 3 (15" long) pieces of 1" × 4" wood
- 1 piece of scrap wood 15"–20" long
- 1 piece of dowel rod about 32" long
- Wood glue
- Wood screws: 4 (1"), 8 (2")
- Drill with a #2 Phillips bit
- Saw

Lay the 30" piece of wood down on your workspace. Spread some wood glue on the flat end of your first 15" piece and place it at 15°–20° angle on the right flat end of the 30" board. Secure the wood by drilling in a couple of wood screws. Take the second 15" board and place it about a foot away from the first on the 30" piece, at the same slight angle in the opposite direction. Secure with wood glue and a couple of screws. Attach the scrap wood at the bottom edge of your 30" piece, perpendicular to the 15" pieces. This scrap will act as the base to the inkle loom.

Next saw your dowel rod into pegs that are equal lengths of 6". You will need 8 pegs for the inkle loom. Drill a ½"-deep hole in the bottom of each

peg (I use a vise to hold the peg steady while drilling) and attach 3 of them to the flat side of each angled 15" piece of wood. The first peg on each piece of 15" wood should be attached 2" from the top, the second 2" from the bottom, and the third right in the middle—about 8" from the bottom. To attach, put a little wood glue on the back of each peg and also on the screw threads themselves for extra security. Attach the seventh peg to the front end of the 30" piece of wood just under the lowest peg on the first angled 15" board.

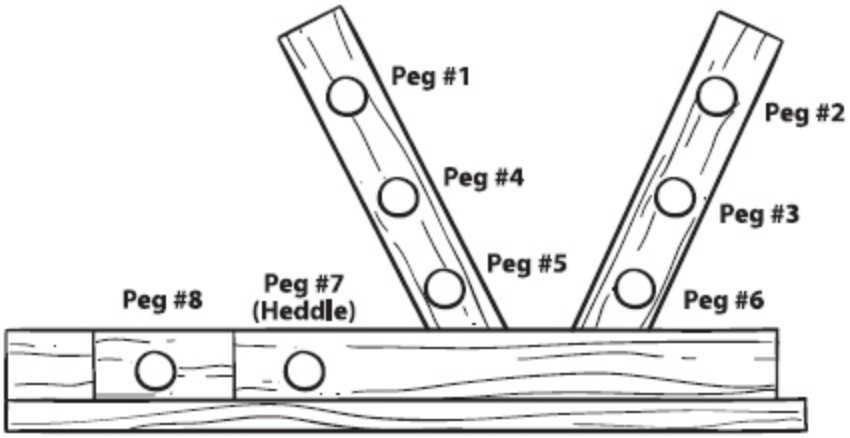
Attach the last peg to the front of the third piece of 15" wood. Use a C-clamp to secure this piece of wood to the 30" board on the loom while you thread the pegs. You can remove the C-clamp once the pegs are threaded and tension is established between the loom and the eighth peg. This piece of wood will move back and forth as you begin operating the loom.

THREADING THE INKLE LOOM

You will need two sets of cordage to weave on your inkle loom. I generally use a jute string and often two different colors, one for the warps and another for the weft, which produces an attractive pattern. Tie the tail of your first set of cordage to the 15" board that holds peg 8. Now bring your string over the top of pegs 1 and 2, under peg 3, over peg 4, under peg 5, over peg 6, skip the heddle peg (7), and under peg 8. Now bring your string back to the top of the loom, but this time go under peg 1 and then again over 2, under 3, over 4, under 5, over 6, skip 7, and under 8. Bring the string to the top of the loom once more but this time string it over 1, over 2 . . . and so forth. Essentially you will be alternating your over/under for only peg 1. The direction of string for the other pegs will always remain the same. Continue to place the warps this way until you reach your desired project width. This space between the strings that were passed over peg 1

and those that were passed under peg 1 will create your shed, and your shuttle will pass through this space.

A **net needle** works very well as a shuttle for the inkle loom. To begin weaving, attach your second supply of string to the warp strings in front of peg 8. Load your shuttle with the string. Attach with a simple clove hitch so you can easily undo the knot later. For the first row, push the warp strings in front of peg 1 down to make the shed. Pass your shuttle through this space. For the second row, push the warp strings in front of peg 1 up, and pass your shuttle through this space. As you continue with this pattern, use your beater stick to push down each weft on the warps as you loom.



Inkle loom

ROTATING THE PIECE

After you have been weaving for a while and the weft is about an inch away from the heddle, it is time to rotate your piece. Undo the clove hitch that you used to attach the weft to the loom and tie it around the warp strings, securing it with a tight overhand knot. Now that your second cordage is free from the loom, pull the work away from you so that it is moving backward over the base of the loom and push the heddle strings up.

Keep pulling the work backward and pushing the heddle strings up until the woven piece is winding under the loom and the warp in front of you is clear and ready to receive the weft.

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WAIST LOOMS

Waist looms are one of the easiest ways to create long pieces of strapping such as tumplines if you do not have a full-sized inkle loom at your disposal. What makes the waist loom an appealing option is that you can weave projects of unlimited length. The weaver uses himself as the base of the loom with a stick and a waist strap or two metal rings. The warps are separated by a warp loop, and then the heddle strings are attached to a floating stick. The warps can then be manipulated by lifting the warp or heddle string to open a shed. The weft is woven into the shed with a shuttle of your choosing. Use another stick to roll up the completed product as the weaving progresses.

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NETS AND NET MAKING

If you plan to spend time in an area with waterways, **net making** will prove to be one of the most valuable skills you will ever learn. You can make nets of any shape, size, or dimension to fit your needs. A good gill net (or stop net, as they are sometimes called) is a reliable source of food. Nets are wonderful to have on hand because they can also be multipurposed to cover and haul cargo or incorporated in land traps when capturing live food.

GILL NETS

Building a gill net takes a little effort but is an invaluable skill for long-term sustainability in the wilderness. These nets can be placed in a creek to catch fish or small mammals. For net building you will need the following:

- Large quantity of cordage with a thin diameter (I prefer #6 bankline)
- Small amount of a thick cordage (like #36 bankline)
- Net needle (these can be handmade with pine or cedar but commercial versions are also available in plastic)
- Mesh gauge that is the same width as your net needle

LOADING THE NET NEEDLE

First tie a clove hitch into your thin cordage and slip it over the point in your net needle. Flip the net needle to the back, bring the cordage down to the end of the net needle, wrap it around the base, bring it back up and wrap it around the point again, flip the net needle to the front, wrap the cordage around the base, back up around the center point, flip the needle to the back, and so forth until your cordage is loaded about three-quarters of the way up the point in your net needle.

SETTING UP THE MESH

Tie your head line to two stationary objects so that it stretches out at a height that is comfortable for you to begin working. This thicker cordage will act as your head line, and you will build your mesh by attaching the cordage from the net needle directly to this line.

Pull line from the point of the net needle and attach it to the head line with a clove hitch. You are now ready to secure your thin cordage to your head line with a series of knots. Using a mesh gauge ensures that every space in your mesh is the same width. Remember, the size of the spaces in your mesh determine what you will catch. If your spaces are 2" wide, anything that is smaller than 2" will be able to escape.

Bring your net needle line up at an angle and wrap it behind and over the head line and mesh gauge. Now bring the net needle line up again, but this time wrap it behind and over only the head line and make a knot around the loop you just made. Move like this, over the mesh gauge and head line, and then over just the head line and around your loop, until you have 15 knots in your head line.

OPERATING THE NET NEEDLE

Now that the cord from your net needle is secured to the bankline you will start forming the mesh. Begin where your needle is positioned at the right-hand side of your knots and work your way back to the first clove hitch. Hold your mesh gauge below the 15 loops you created with your first set of knots. Bring your net needle cord behind the mesh gauge and through the first loop. Pull the line the whole way through and tighten it against that mesh gauge. Then bring your line back up and around the back of your loop to make a knot. Work this way through all the loops until you get back to your first clove hitch. Hold the mesh gauge against your second set of loops and work your way to the end of the line, continuing to add to the loops until you reach your desired length.

FUNNEL NETS

Funnel nets are designed to be placed with the opening on the upstream side of the stream. They can then be pegged in place, and you can create a further funnel with natural debris or bait them for larger animals like turtles. A funnel net is constructed like a gill net, except for the head rope. Here, circle and lash a natural material like a green branch as a hoop at the head of your funnel. You can add additional hoops to the inside after the net is completed if you are working with a very long product. In this trap the fish will swim in but cannot turn around in the back of the funnel.

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TUMPLINES

Tumplines, sometimes called **burden straps**, have been used for hundreds of years. Many cultures to this day still use a tumpline so that people can carry heavy loads on their backs, burdens that may be too large or cumbersome for normal pack straps. The tumpline is a strap that extends around the load itself and is worn on the crown of the head. The wearer slightly bends at the waist so that the weight is actually carried down the spine of the back and no tension is placed on the neck or shoulder muscles. Tumplines can be made from cordage, rope, or strapping and are sometimes hand woven and ornately decorated. Most measure about 6'–12' in length and have an approximate 2' area in the center that is wider than the rest of the strap. Some even have decorative split tails at the end that hang for 2'–3'.

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TIPS AND TRICKS

1. Reverse-wrap, two-ply cordage can be made from an existing material such as a bankline to increase tensile strength or with natural fibers like barks twisted together.
2. A fisherman’s knot is the best for joining any cordage in a netting or weaving project.
3. A separate tool, called a beater stick, can be made to essentially pack the wefts while weaving and will increase the durability and overall quality of the finished product.
4. If you plan to carve tools like needles and shuttles from natural materials, it pays to use dry woods as a green wood will usually crack when carved thin.

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Chapter 7
TRAPPING

"*There is but one way to learn to do a thing and that is* to do it."

—DANIEL CARTER BEARD, *THE FIELD AND FOREST HANDY BOOK*

The topic of primitive trapping could fill an entire volume of its own, but I will cover just the most important information you need to become an effective, self-reliant trapper. In the old days, trappers used a combination of steel and primitive traps that were built using readily available materials. This would ensure good numbers of fur were taken without having to carry a hundred or more traps to the line. In an extended wilderness stay it is absolutely necessary to carry steel traps, but you must also have a direct knowledge of what it takes to successfully use primitive trapping methods. Metal traps did not become popular until the mid-1700s. Before then, many animals were caught using methods taught in the forests of Europe and in the United States by Native American mentors. When considering trapping as a means for survival, you are less concerned with specific species that provide fur and are instead focused on looking for edible meat sources. In order to be successful a trapper you need to first understand the progression of lower-food-chain resources (which animals other animals eat) to larger, more trap-worthy animals. You need to be clear about which animal you are hunting and how to identify signs of that animal when setting your traps.

You should have a good working knowledge of traps for three main food sources: mammals, fish, and fowl.

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ANIMAL BEHAVIOR

Effective trapping requires some basic knowledge of animal behavioral patterns. You need to understand:

- What they eat
- Where they live
- Where they travel

Animals are predictable. They need the same things we do: a comfortable place to sleep, water, and food. Outside of satisfying basic needs, their sole purpose in life is reproduction of their species. Animals are most relaxed when sleeping, followed by traveling to and from a feeding or watering area. They are most wary and cautious when actually feeding or watering. Travel routes are excellent places to set traps because animals are opportunistic in nature and can often be lured with bait. Remember that animals usually travel the same routes, and this makes it easy to learn their patterns. Their tendency to operate in patterns also makes it easy for them to recognize when something has changed in their direct environment. While scent or human odor is nothing new to an animal, a change such as a trap set in the area may take a couple of passes before it overwhelms their curiosity. Be prepared to wait it out and try not to get anxious when a trap has not been visited or tampered with 48–72 hours after being set.

An animal's diet is another important factor in trapping because a baited trap is a hundred times more likely to catch an animal than a curiosity-type set that is not baited. Snares in trails can be effective but present some challenges that will be covered later.

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ANIMAL SIGN

Animal **sign** is the key to eliminating guesswork when setting your traps. Only trap where there is sign. Sign is anything the animal leaves as a trace that indicates it may have passed through the area. There are seven types of sign you need to know that will help you identify things like species, eating habits, and population numbers:

1. **Tracks**: Examining tracks is the easiest way to identify the species. This can also help determine population numbers, frequency of travel in that area, and even preferred food in cases where you can tell that one animal has been trailing another.
2. **Scat**: Scat left when an animal defecates can also help you identify species as well as what food source the animal is currently foraging.
3. **Slough**: Slough is something from the animal's body left behind after it is gone. Examples include a strand of hair on a fence wire, a feather dropped while preening, or shed snakeskin.
4. **Remains**: The dead body of an animal will not only provide possible resources such as bait and attractants for other traps, but it also may give some idea of what other animals are in the area.
5. **Refuse**: Refuse is the animal's garbage, which will help identify its species and its travel routes. For instance, a squirrel **midden**, or refuse heap, is its favorite spot and will be littered with shells from the nuts it has been eating. A beaver or muskrat leaves behind chewed trees and branches.
6. **Dens**: A den is an animal's home. It can be a hole in the ground, in a bank, or in the hollow of a tree. The type of den is often a sure indicator of the species. You can usually set traps at the entrance or exit.

7. **Odor**: Odor is the trickiest sign to detect, but cat urine has a distinct smell, as does rotten meat from a carnivore den where a fox might live. Obviously you'll smell a skunk in the area, but other subtle smells can be identified as well.

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LOWER-FOOD-CHAIN RESOURCES

Animals at the lower end of the food chain are what every other animal seeks for food. Around the water’s edge this group includes frogs, crayfish, fish, as well as mussels and snails. Seeking these food items for yourself and then delegating a portion of them to the traps you build will enable you to catch more sizable prey items. If you are in an area that contains no water sources, you will need to microtrap in order to secure animals you can use as bait: for instance mice, rats, and chipmunks. You can also choose to combine these techniques. Some of these resources, like larger fish and turtles, are full meals in themselves.

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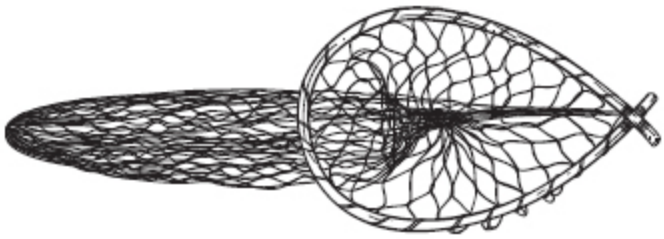
WATER-TYPE TRAPS

Net making is a difficult skill that can take a long time to master, but there are some nets that are easy to fashion and work well. Remember that any net will only catch prey that cannot exit the holes you have created, so many nets must be tailored to the intended fish or animal.

DIP NETS

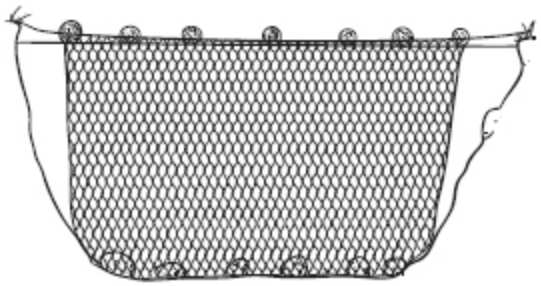
Dip nets are usually attached to a hooped pole with which you can reach into the water and lift the target out while it is trapped. This pole can be fashioned from a green fork that is wrapped against itself to form the loop. The net is attached directly to this hoop while the tool is manufactured.



Dip net

GILL OR STOP NETS

Gill nets must be long enough to stretch from one side of a creek or small river to the other and deep enough to stretch from the top of the water to the bottom. This type of net is usually weighted with stones at the bottom and has some type of flotation device at the top.



Gill net

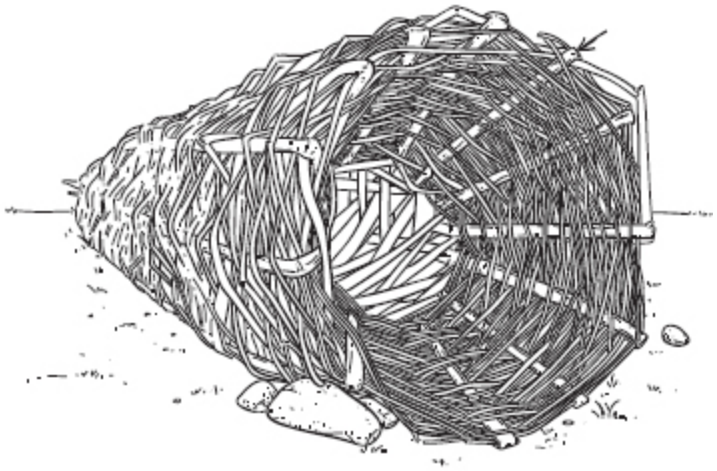
You can drive fish into a gill net by walking downstream and chasing them into it. When they try to leave the net, their gills pass through the holes but their bodies cannot. You can see why it is critical to know the average size of the fish you are hunting in order to make an effective net.

SEINE NETS

A **seine net** is large with very small holes. It can be walked through a deeper water source and often has a long stick on each end that can be used to manipulate smaller fish to a place at the edge of the water where you can grab it.

FUNNEL NETS

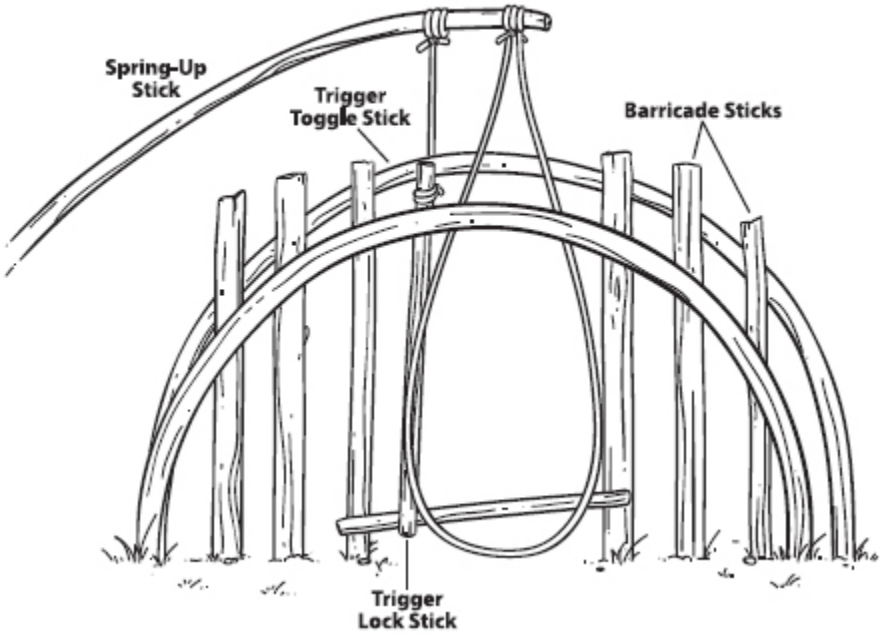
Funnel nets resemble dip nets in many ways and can be made with a small diameter and elongated for fish-type traps, or they can be made with a large diameter and laid flat to trap animals when the net is lifted.



Funnel net

FENCES

Fences are used to guide fish to a certain location in the water or animals such as turtles to a location on the water's edge. They can be built from any natural material including stones, sticks, or even logs. Fencing called a **weir** can be used to trap fish in a smaller area where they can be hunted with a bow or gig.



Fencing

FUNNELS

Funnels are traps woven from natural materials and employ two cones that fit together so that fish can swim in but cannot leave. By simply tying the funnels together, both facing the same direction, you make the trap easier to open. The same concept will work with a 2-liter bottle; cut off the top and and turn it to the inside to trap smaller bait fish. This type of net is woven like a basket, and the outer piece has a hole in the bottom from which fish can swim into the larger cone where they will get trapped.

LINES WITH L7 TRIGGERS

L7 triggers are simple reverse notches that form a quick-release system. Employing L7 triggers in fishing involves using line and a trap together to actually set the hook after the animal runs with the bait. An L7 trigger is combined with a spring-pole device, allowing the line to be hand-cast off the bank with a baited hook. When the fish or turtle runs with the bait it

dislodges the L7 trigger, which springs the pole and immediately jerks the line to set or lodge the hook in the throat of the prey.

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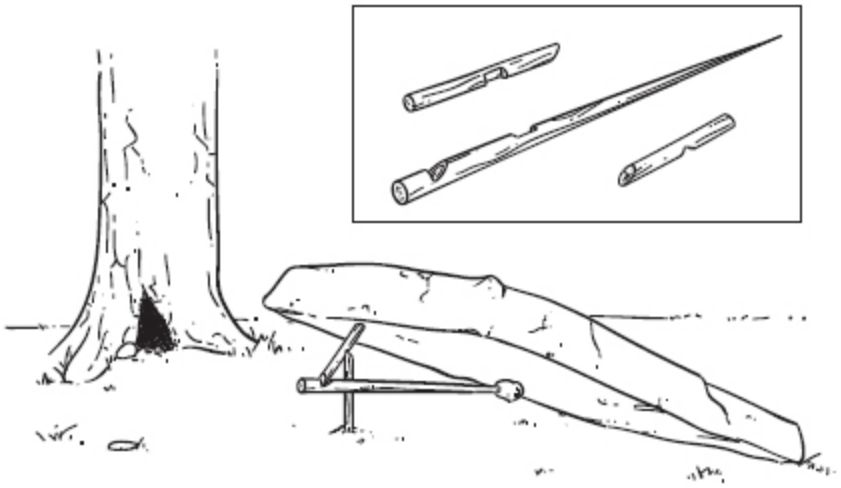
TYPES OF PRIMITIVE TRAPS

Most primitive traps work like a simple machine. In fact, you will use some of the five machines discussed in Chapter 3 for constructing them. Understanding your tools will allow you to improvise varieties of traps that adapt to conditions and available game. Deadfall traps will always involve a lever and fulcrum. These bear the weight of the deadfall device and are released by a trigger that many times doubles as a bait stick.

Primitive traps are designed to accomplish at least one of three things: strangle, mangle, or dangle. Many of them use the common releases or triggering systems.

LEANING DEADFALLS

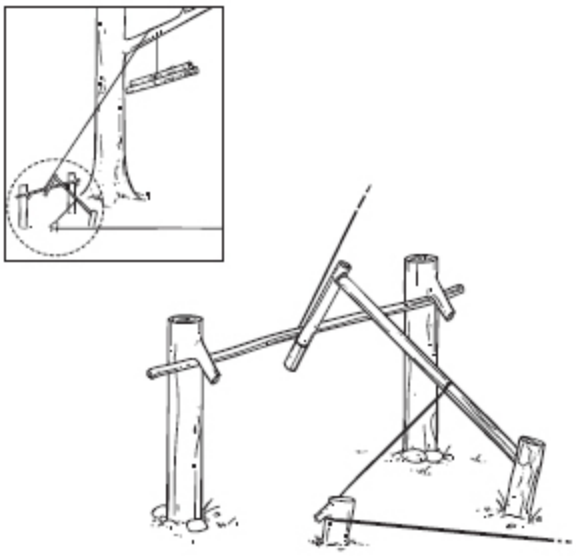
To set a leaning deadfall trap, position a heavy object so that one end leans on the ground, with the weight of the leaning object held up by a trigger device. This device releases the weight of the deadfall device.



Leaning deadfall

SUSPENDED DEADFALLS

Suspended deadfall traps involve a suspended deadfalling device above the ground that drops upon release. These can be combined with spikes or spear points for larger game.



Suspended deadfall trap

BUSHCRAFT TIP

Deadfalls are the most misrepresented trap, often poorly illustrated in books and incorrectly taught by instructors. Deadfalling traps are not always intended to instantly kill prey; some of the smaller deadfalls used for microtrapping rodent species will suffocate the animal instead. Confusion over how the animal actually dies is part of the problem. Many people will raise a deadfall like a rock or log at a high angle, thinking this will help them achieve crushing power. The truth is, the higher the angle of the deadfall, the greater the chance the animal will escape the trap before the object makes contact.

There are two simple rules of thumb when employing leaning deadfall devices: The first is that deadfalls should be five times heavier than the weight of the animal to be trapped, and the second is that the deadfall should never be at an angle greater than 30° from the ground. Remember that traps and trap components must match the size of your quarry. When going after a small rodent, don't use a 2" branch that is too heavy for the animal to pull down or manipulate.

WINDLASS MACHINES (KLEPTSY)

The windlass is used on this trap as a winding device. This creates spring-loaded tension to hold a killing device in place by a bait stick. When the bait stick is removed, it lets the windlass release, swinging the device under tension to kill the target prey.

These traps involve a windlass machine that delivers a killing blow or deploys a spike or spear to impale the animal upon release of the trigger.

FREE-HANGING SNARES

Unpowered snares rely strictly on the animal's struggles to tighten and hold it in the trap. These are often the least effective traps when manufactured in a primitive fashion; however, cable snares in this configuration can be very effective.

POWERED SNARES

Snares involving a spring-loaded engine or a counterweight device can be very effective depending on the setup. They just need to lift the animal off the ground using noncable snares. Remember, an animal will do whatever it can to escape if it is alive, which includes chewing. If the animal is on the ground, it has lots of opportunities to chew its way out of

the trap. Most snares will not catch the animal around the neck; more often than not, the snare will encircle the animal's body. Snare loops need to be set at a targeted diameter to ensure a proper catch. A snare set a bit larger than an opossum's head is not likely to catch a coyote. Again, this is why it's important to pay attention to animal sign on the trail so that you know you are setting your traps for the right animals.

TRAP TRIGGERS

Triggers involve the total machine and its operational setup. Following are illustrations of each type of trigger and how to employ the machine into a trap system.

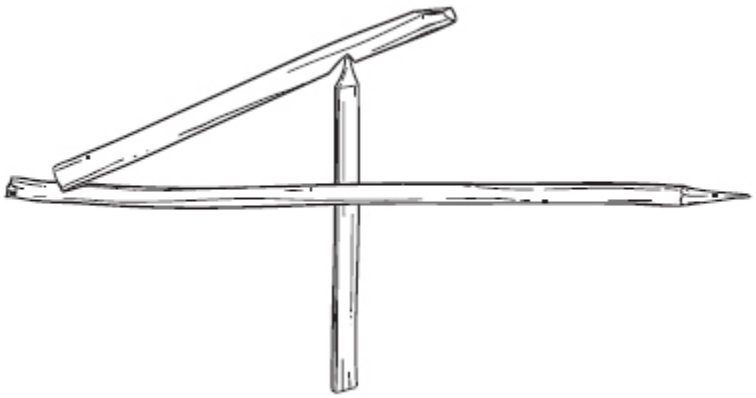
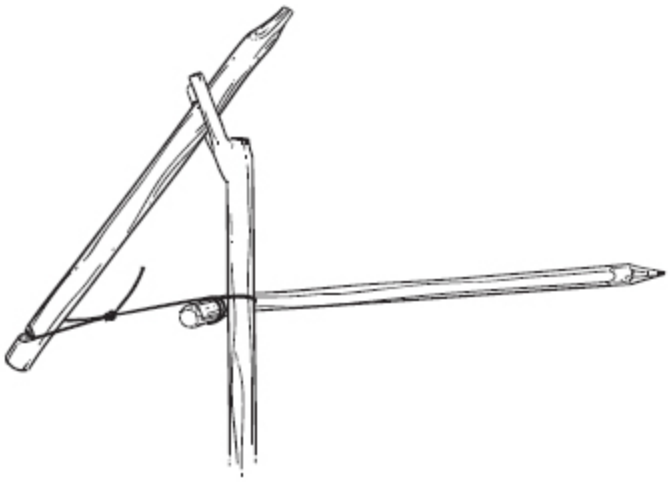
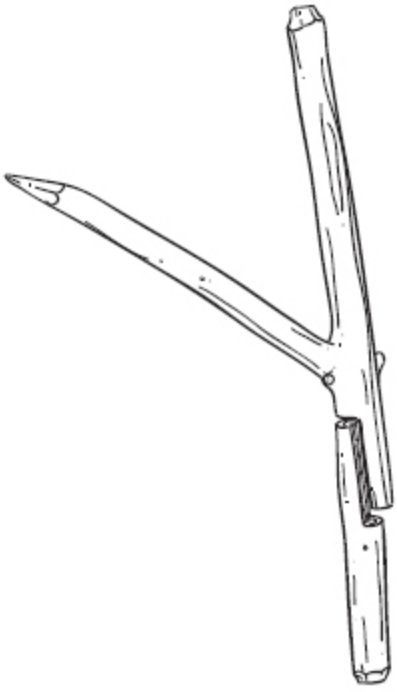


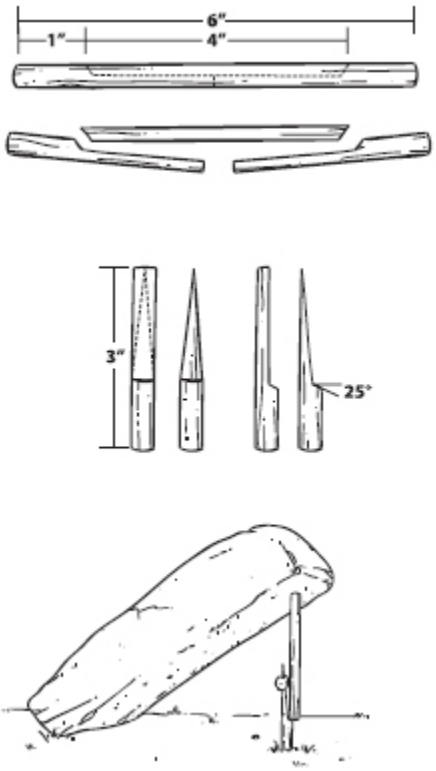
Figure-4 trigger and figure-4 trigger reversed (modified)



Piute trigger



Split trigger



Promontory peg

The L7 trigger is named for the L cut out from the trigger and the 7 cut into the stake. These cuts create a sort of puzzle-piece effect. Each piece is held in place by friction from a spring device that is used to power the trap.

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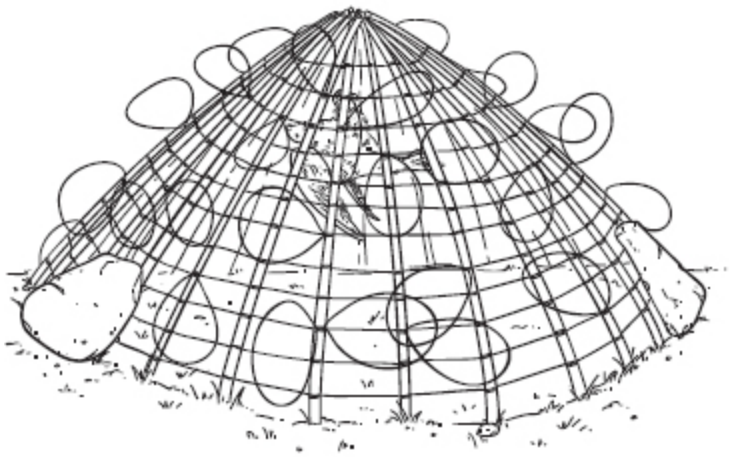
TRAPPING BIRDS

All North American birds are edible and plentiful, which makes them a good choice for your table in a long-term outing. For catching birds, three traps work the best: multiple ground snares, Ojibwa bird traps, and cage-style traps.

MULTIPLE GROUND SNARES

A simple stake in the ground surrounded by a small pile of ground debris can work with a group of small-diameter snares to create a network of ground snares. If you bait them with something on which the birds are feeding, such as small seeds, it is one of the most effective traps for small birds. The biggest challenges to this setup are:

1. They must be small—snares should be made from very fine line.
2. You need a lot of them—at least 25 snares with 2"–3" overlapping loops for a 2' square area.

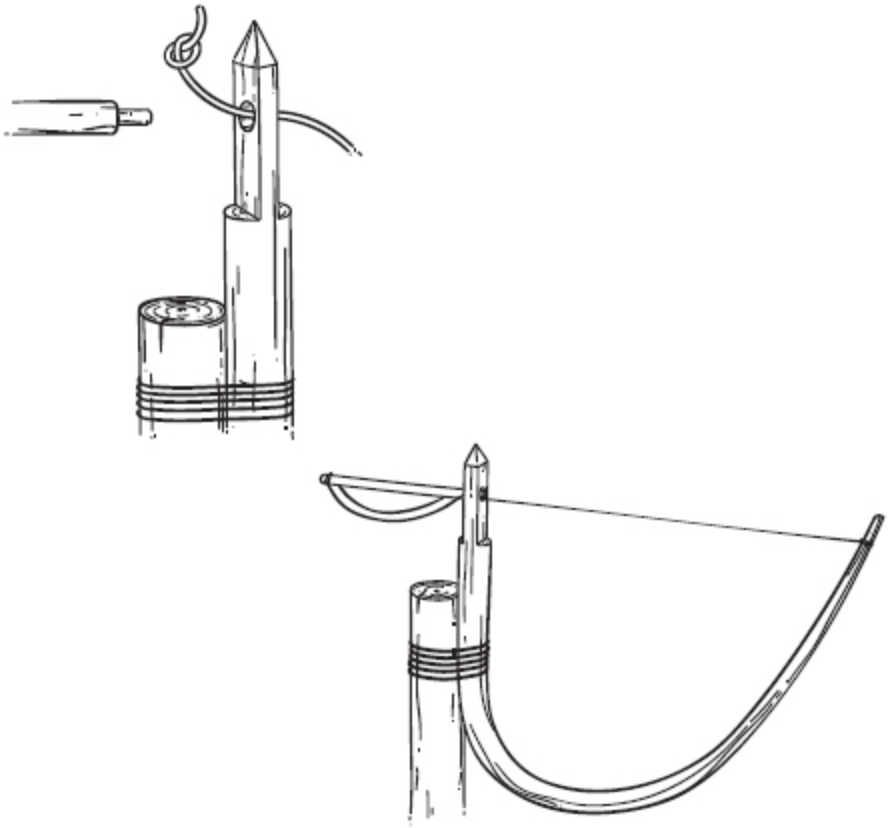


Multiple ground snares

OJIBWA BIRD TRAP

The Ojibwa trap uses a landing perch to lure the bird. The weight of the bird on the perch activates the snare, which in turn traps the bird by its feet. You first need a pole tall enough for a bird to want to land on, but not so tall that you cannot retrieve the bird after it is trapped. Sharpen the pole into a point on both ends. Sharpening will make it easy to drive one end into the ground and will ensure that the bird is not tempted to land on the other end instead of landing on the trigger.

Drill or carve a hole into the top of your pole, about 2" from the point. Place a second stick, about 4" long, into the hole. The diameter of this stick should be just a little bit less than the hole so that the stick rests in the hole rather than being tightly screwed into it. This stick will be the perch. Select a piece of thin cordage about half the length of your pole; this is the snare. It is important that this cord is not too long or else your counterweight will rest on the ground instead of pulling tightly when the snare is activated. Tie a stop knot about one-third of the way into your cord. Use a clove hitch to create a loop in the other side of the knot on your cordage (the longer side). String the cordage through the hole on your pole. Tie a rock that’s about the size of the bird you intend to trap on the end opposite of the loop. Place your perch stick into the hole where you have strung the snare. Carefully lay the loop of your snare on the perch. This perch is the trigger stick, and when the bird lands on it the trap will drop the rock and activate the snare. The bird will instinctively grab the stick when it lands, which will ensure that its legs are inside the loop of your activated snare. The big trick to this setup is making sure that the closed snare is drawn close to the upright pole so that when the bird is trapped it is held tight and close in an upside-down position.



Ojibwa trap

CAGE-STYLE TRAPS

Before building a cage-style trap, you will need to prepare a series of sticks that are similar in diameter but get progressively shorter in length in order to build a cage similar to a pyramid. Make sure the sticks you select are fairly straight and about ½" in diameter. Cut 2 sticks for each of the following lengths: 12", 11", 10", 9", 8", 7", 6", and 5". Finally, cut 6 sticks about 4" long.

Take the 12" sticks and place them parallel to each other, about a foot apart. Attach a length of cord between the two sticks about 1" from their top ends. Attach a length of cord, equal to the first, between the 2 sticks about

1" from their bottom ends. Flip one of the sticks over so that the cords cross each other to form an X.

Push the 11" sticks under the cord, perpendicular to the 12" sticks, until they feel tight against the cord. The four sticks should now form a square. Now push the 10" sticks under the cord and over the 12" sticks until they feel tight. Push the 9" sticks under the cord and over the 11" sticks until they feel tight. Continue adding sticks under the cord, alternating sides like a log cabin until you get to the 4" sticks. Line these sticks in a row next to each other to create a secure roof on your cage. Double-check that there are no gaps on the roof too large through which a bird might escape. If you do see gaps, just fill them in with more 4" sticks.

BUSHCRAFT TIP

One of the main concepts to keep in mind for long-term wilderness living is that live food never spoils. Native peoples of the Americas realized this and began to cage and breed wild turkey and other animals a long time ago. The important thing to remember is that you should not process the food straight away, only care for it while you have it alive. This can be of big advantage in hot weather, but it can also be troublesome if you are in an area with many large predatory animals. This principle is very advantageous when you've caught animals such as turtles and frogs, which can be kept for a time in a sack or bag.

Small tripping lines work well when connected to a step or break-away trigger so that birds set off the trap as they are attempting to hop or duck the strings in order to access the seed bait in the center of the trap. In the right conditions, this type of trap can catch up to ten birds an hour.

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HUNTING

Hunting has been used since the beginning of time to secure meat to feed families. It is an art form that in recent times has been spoiled by technology. These days we put too much emphasis on the fastest-shooting bow and the longest-range rifles with expensive optics. It's hard to imagine that not even 200 years ago Native Americans were still hunting buffalo by riding in fields on horseback and shooting them with arrows! Evolving and adapting to our environment is at the core of survival, so there are many benefits to the improvements in hunting practices. Even so, we have also lost many valuable skills such as stalking, closing distance, and tracking prey. These skills demonstrate true self-reliance. In Africa there are tribes to this day that run and track large game animals until the beasts drop from exhaustion and are dispatched by spear. To many of us this would seem inhumane and unnecessary, but to our ancestors it was part of life. True hunting—spotting and stalking on the ground with primitive or improvised weapons—is by far the most difficult way to secure meat, but it can also guarantee food consistently while on the move.

LARGE GAME VERSUS SMALL GAME

The question of whether to hunt large game such as deer or small game like rabbit depends on the situation. Logistically, large game takes large amounts of time and energy both to process and to preserve. Small game can be prepared easily and eaten on the spot if necessary. Large game is a much better option for long-term situations that involve a base camp with an operation for proper preserving.

The other issue that must be considered is the dangers involved in hunting any large game. For example, you're much less likely to be injured by a wounded squirrel than by a wounded hog! Large game, even deer, can

be dangerous if you must dispatch them up close. Another consideration is the sheer numbers of available animals. For each deer in a given area there may be ten rabbits, ten squirrels, and twenty chipmunks. Think about the number of birds you see flying away when you walk through the woods compared to deer or other large game you see fleeing.

THROWING STICKS

Many cultures even to this day use throwing sticks of differing configurations for securing small mammals and birds. The **throwing stick** is one of the easiest improvised weapons to create and use effectively, even if you do not have a lot of practice. The biggest convenience of the throwing stick, or rabbit stick as it is sometimes called, is that it can be carried on your belt so that it is out of the way and your hands are free until the second you need it. The reason that the throwing stick is so effective is that it rotates as you throw it so that even marginal shots can be successful. Think about how much easier it is to hit a squirrel with a shotgun compared to a rifle. It is all about surface area!

Throwing sticks are generally about the length of your arm from wrist to shoulder and about 2" in diameter. They can be somewhat bent or they can be straight. The throwing stick kills by inflicting blunt force trauma, so it should always be made of hardwood.

THROWING STARS

This weapon is a further innovation to the throwing stick. The **throwing star** uses two straight sticks with points on both ends that are notched and lashed together to form an X or cross of sorts. This weapon relies on surface area and rotation and can be quite effective even on medium-sized animals such as raccoons. The main drawback to the throwing star is that it is

cumbersome and cannot easily be stored, requiring you to hold it while you walk.

SPEARS AND GIGS

Spears and gigs, easily improvised from natural material, work well as weapons. Spear tips can be made by fire-hardening wood or fashioning stone or pieces of glass into sharp points. Many knives now are designed to be used as spear points for emergencies. Of course, then you are giving up your knife to tie it to the end of a pole, so this is not always the best idea. Commercial versions of gigs are available, but they can be easily fashioned from wood. Gigs work well for fishing and underwater use.

SLINGS

You can use any fabric, such as a bandanna or cordage, to make a sling that will allow you to launch a single stone at your prey. This is a frustrating weapon to master due to the limitations of working with one piece of ammunition at a time. It takes a lot of practice. The biggest advantage of using a sling is the abundance of ammunition because any semiround rock you can find will work.

SLINGSHOTS

The **slingshot**, in my opinion, is one of the most inexpensive and practical survival tools for short-term self-reliance. You can purchase commercial folding slingshots or make one yourself very cheaply, and ammunition is available along any creek bank. Slingshots are not difficult to master and fit easily into your day pack. To keep things light, you can even just carry the bands and improvise the frame with natural materials you find on the trail.

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TIPS AND TRICKS

1. Use your throwing stick as a multipurpose tool. If you sharpen and fire one end, it can be used as a digging stick and baton.
2. Don’t overlook the fact that animal remains can provide tools needed in an emergency situation.
3. When setting deadfall traps, remember the killing device should be five times heavier than the intended prey.
4. One animal will always provide bait or lure to trap others; never waste the glands and guts of any animal.
5. Most animals are easily attracted to a bait not common to the area. For example, if black- or blue-colored berries are common in one area, bait a bird trap with red berries if you can find them. If hickory is the hardwood in an area you plan to trap squirrels, bait traps with walnuts instead.

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Chapter 8
PRESERVING FOOD SOURCES

"The more survival skills an individual has that have been practiced physically and otherwise, the better odds they have for those skills coming to the forefront during a stressful emergency."

—Cody Lundin, *98.6 Degrees: The Art of Keeping Your Ass Alive!*

The eastern woodlands provide many sources of food to keep you in good supply during your stay in the wilderness. As you consider harvesting these resources, it is important to also think of what can be preserved. Humans have been preserving food since time immemorial, from cooking a large quantity of meat in order to make it last for a few days longer to burying it in snow to keep it fresh. There are a variety of ways to keep meat and process plant food sources to extend their use.

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FLOURS AND MEALS

These plant-based flours can be used in recipes, eaten alone, or added to another grain-based meal. Although plant-based flours are not technically categorized as preserved food, grinding things like acorns is a way of repurposing your resources and extending their life.

ACORN FLOUR

Acorn flour was a staple food item for many native peoples throughout history and acorns remain a major source of food for forest animals today. Its versatility makes it one of the eastern woodlands' best plant-based food resources. I tend to seek out white oak acorns because they have fewer tannins and taste less bitter. **Tannins** within the acorn can give it a very astringent taste. It is important that acorns are processed correctly so they have a gentler flavor.

To process, you must first remove the shells. Crush the acorns with a rock or an axe. Then place the crushed acorns in a bowl of water; the shells will float and the meat will sink. Toss the shells. You want to process the meat down to the smallest-sized granules possible, so you will leach the meat and remove the tannins. To do this, drop the meat of the acorns in a clean batch of boiling water and let it cook until the water becomes brown. This discoloration is from the tannins. Place the acorn meat in another pot of boiling water and repeat the process. Make sure the water in the second pot is already boiling, because if the acorns come in contact with cold water, the process will undo itself. You will likely need to move the acorn meat to a new pot of boiling water three or four times before the staining stops. When the majority of the tannins have been removed, the water will remain clean. If you don't have the necessary tools or setup, acorn meat can be leached in running creek water by placing it in a cloth sack and leaving it

in the creek for a week or so. However, the resulting flavor is not as reliable as what you get with the boiling method.

Once the meat is well soaked and clean you can use a stone to grind it into a meal for hot cereal, use it as a bread ingredient, or dry it out and store it for later use. If you decide to save the acorn flour for later, plan to soak it in water before you use it to rehydrate it to its mushy status.

BUSHCRAFT TIP

The tannins that give acorns their astringent taste can be a great resource for other things like medicines and tanning. Save the liquid from the first pot of boiling water you used to leach the acorn meat and reserve it for later use. Astringents work best for external use in a wash or poultice, and the solution will be antiparasitic as well.

CATTAIL FLOUR

Cattail makes the best form of starchy flour that nature has to offer, and the process of extracting it is not overly complicated. First you will need to collect a good bucketful of cattail roots. Loosen the soil around the cattail and its root area. Then put your hand at the base of the stalk and pull to release the entire plant with the root. At this point you can ditch the stalks and just hang on to the roots. Once you have washed and thoroughly peeled them, place them in a bucket of clean water. Here you will begin to break up the roots, which causes the flour to separate from the fibers. Continue until you have separated all the fibers in the roots. As you work, the flour will settle at the bottom of the bucket. Pour out the excess water and dump the remaining mush on a flat surface where it can dry in the sun. Once the flour is completely dry, store it in a cool, dry place away from insects.

CATTAIL ACORN BREAD

2 cups acorn flour

2 cups cattail flour

2¼ teaspoons dry yeast

1½ teaspoons salt

⅓ cup maple syrup

½ cup water

1 cup milk

2 tablespoons vegetable oil

Mix all the ingredients into a dough, shape it into patties, and throw it on some hot ash from your coals to make ash cakes. Wait until the ash is hot enough that it turns white. Brown the ash cakes to your liking, about 3–4 minutes on each side.

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NUTS

Rich in protein, nuts are some of the easiest plant-based food resources to harvest.

PINE NUTS

All pine nut seeds are edible, so you do not need to worry about identifying different species. Some have larger seeds than others, and even though you can eat them green, the older ones taste better. The trick is to catch them at just the right time before they drop from the cones. Look for cones that are turning brown but have not yet opened. Arrange them around a fire, and the warmth will force them open so that you can collect the seeds. Just be careful of mildew, which is the enemy of any seed. Keeping them dry is the key.

HICKORY NUTS

Hickory nuts are delicious and especially valuable because their shells efficiently lock out moisture and insects, so they keep for a very long time. Most folks do not care to fool with hickory nuts because they can be difficult to open. Often after all that work you will end up with small pieces of shell everywhere and only a tiny bit of meat. Let me share a secret with you. You have to take advantage of the internal structure of the hull itself to break it cleanly. I prefer to use an axe, but any hammering device—even just a stone—will work.

Turn the nut so that it is lying sideways and the sharp, raised edge is on top. (Basically, turn it to the spot where it wobbles and will not stand on its own.) Then strike the seam in a spot about one-third of the way from the base of the stem. If you follow these steps, you should easily pop the nut into three pieces every time with plenty of exposed meat for the picking.

WALNUTS

Walnuts, specifically black walnuts, are totally different from hickory nuts. If possible, collect them before they fall from the tree and then store them until they turn black. If you do collect any from the ground, inspect them very closely for worm holes. Remove the outer skins from the shells when they turn black and use them for dyes and medicines. Once you have the nut shells, you can then break them open and eat the meat inside. Walnuts do not store in the shell as well as hickory nuts. If you decide to save them for future use, dry them before storing. Leave them in the shell and crack it open just before eating.

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FRUITS, VEGETABLES, AND HERBS

You can find a few good fruits (raspberries, blackberries, and blueberries) during certain times of the year in the eastern woodlands. The northern regions tend to have larger varieties. Berries are energizing to eat and add vitamins and fiber to your diet.

FORAGING FOR BERRIES

Take extra care to make certain you can identify any berries before eating them. When in doubt, do not eat!

When looking for berries, scan the area from ground level to eye level. Look for low fruit trees and bushes. A lot of species are creepers, so scan the ground very well. Remember that berry plants are biologically constructed to protect themselves from birds. So they are often hiding under greenery or surrounded with thorns. Keep a close eye out for poison ivy too.

FRUIT	WHERE TO LOOK	SEASON
Blueberries	Blueberries grow in bush form. They flourish in acidic soil, so you can sometimes find them in dried-up beaver ponds or near oak trees. They grow particularly well in sunny meadows.	Flowers in spring, berries in summer.
Elderberries	Moist forest soil along trails and around fields.	Bloom June to July, fruits appear in late summer into fall.
Raspberries	Grow in bushes, usually found in areas that receive full sun.	Blossom in spring, fruit in summer.
Blackberries	Grow in small patches of brambly vines. Look in areas near drainage ditches or trails.	Bloom in midsummer, eat in late summer.
Wild cherries	Grow rapidly from seeds dropped by birds so they are usually found as colonies of trees in clearings.	Blossoms in spring, fruits in summer—often hold until fall.
Cranberries	Grow best in acidic soil and bogs.	Ripen in the fall and usually stay on plant through winter.
Strawberries	Grow close to the ground anywhere.	Blossom in spring, fruit in early summer.
Mulberries	Edges of fields, open woods.	Very hardy, can survive in extremely cold temperatures.
Wild grapes	Occur throughout the eastern woodlands in several species.	Very hard and cold-weather resistant.
Autumn olives	This species is invasive and grows in mostly field edges.	It blooms in early fall and becomes better after the first frost, making it a cold-weather plant.

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FRUIT LEATHER

Making fruit leather is the best way to preserve fruit for later consumption when you do not have the resources to set up a canning operation. For this simple process you do not need much more than a sky full of sun.

First mash and grind the fruit into a purée. You can easily remove the seeds by picking them out of the mash with your hands. Spread the purée over a flat surface, like a rock or cutting board that is about ⅛" thick. Leave it in the sun to dry for a few hours. You will know the fruit leather is ready by the glossy look the purée will get when it dries. Store it in a cool place where it will be safe from bugs and moisture. Fruit leather will last a couple months at room temperature but longer if it is kept cool. You can eat it as it is, rehydrate it to make drinks, or use it as an additive for recipes such as bread and cereal.

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PLANT SOURCES OF STORABLE FOODS

Many plants provide storable food resources like seeds, seasonings, or bulbs. These food items can be processed and dried for later use.

BULBS

Bulbs can be stored in a cool, dry place for a whole season. There are some great plants with edible bulbs, such as wild garlic or onion garlic, in the woodlands. Ramps and leeks also contain edible and delicious bulbs.

ROOTS AND TUBERS

Cattail contains an edible, starchy tuber that can be eaten as well as stored dry. Arrowhead is another water plant with an edible tuber that has high starch content. Burdock contains a large taproot similar to the potato and can be easily stored for later use if kept dry. Dandelion root makes a good drink or coffee substitute. You can even dry it and grind it down for later use in a hot drink. Yellow nut grass is another edible root plant native around areas of water where cattails and arrowhead are found.

BUSHCRAFT TIP

The center of the cattail shoot is a nutrient-dense, edible resource that makes an excellent vegetable you can simmer in soups or sauté as a side dish. Harvest the cattail shoots in dry weather so that the ground is not too muddy. Select large stalks that have not begun to flower, and separate the outer leaves from the core of the stalk. Discard these tough outer layers until you get down to the soft center. This process requires a lot of peeling, and your hands might get pretty sticky, but the product

is delicious and rich in vitamins including vitamin C, beta carotene, and potassium.

WILD SPICES/HERBS

Most wild herbs can be air-dried for later use. You can grind these dried spices into flavorings for food and teas. A few of my favorites are mustard seed, garlic mustard, mint, shepherd's purse, and dock seeds.

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SAPS

In the early winter months, many trees can be tapped for their sap, but maples and birches are the best sources in the eastern woodlands. This liquid makes a delicious drink straight from the tree on a cold morning. It can be further rendered into syrup by boiling it down to evaporate the water content.

MAPLE SYRUP

Maple syrup is made by further rendering the sap so that it becomes a sweet, sticky liquid. Maple syrup can be used to sweeten any food or drink and keeps very well if stored properly. Once the sap is collected, pour it into a cooking pot until the pot is about three-quarters full. Boil the sap to evaporate all of the water content. This will take several hours of constant boiling. The most difficult thing about making maple syrup is knowing exactly when the water has completely evaporated and the syrup itself has started to boil. If this happens, the liquid will actually burn. Keep an eye on the color. The syrup should gradually turn gold and then darken until it becomes the mahogany shade of maple syrup. Once the syrup is complete you can strain the liquid to get rid of any particles that may have fallen into the concoction during the long boiling process. Pour into glass jars or plastic containers and store in a cool place. It should last in the refrigerator for about six months.

MAPLE SUGAR

Maple syrup can be even further processed into a delicious sweetener called maple sugar. Bring maple syrup to a boil and skim off the air bubbles as they rise. Reduce the heat a little if it starts to boil over the sides of the pot. When the air bubbles stop appearing, remove the liquid from the heat

and transfer it to a wooden bowl. Stir for at least 5 minutes to remove any remaining moisture and then let it stand until it turns hard. This hard material can be ground into sugar and stored in a cool place.

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MEAT

Preserving meat, no matter which method you choose, is a critical process because meat spoils very quickly, especially if you do not have access to refrigeration. Here are a few ways of preserving meat from your hunting or trapping campaign so that it can be safely consumed later.

SALT DRYING

The process of drying meat involves pulling moisture from the meat at a slow rate so that the outside of the meat does not dry first. If the outside of the meat dries too quickly, moisture might get trapped inside, which will cause the meat to go rancid. Moisture is the enemy in meat preservation because it allows bacteria to grow. With this understanding, two environmental conditions are necessary for properly drying meat:

1. A humidity level of about 30 percent or less
2. A few straight days with an even temperature where there is little fluctuation from day to night

For this reason, winter in the eastern woodlands is not a good time to air-dry meat. Be careful in the spring that the weather is not too humid. Consider also the meat that will be used. Meats containing high concentrations of fat hold moisture, which makes the fat go rancid quickly. Most meat will contain some fat, but you will find more in animals that are killed during the winter. Be selective and trim away the fat before drying. It is easier to see the fat in red-meat animals like raccoon. You will have to look very carefully when distinguishing between fat and meat in lighter animals such as opossum.

If you do not have the means to cool the meat in a refrigerator, you will need to salt it immediately after it has been gutted. All of the fatty tissue must be removed from the muscle meat before getting started. Then slice each piece of meat into long, thin strips that are similar in size so that you can achieve even drying. Prepare a heavy salt solution into which each strip will be dipped before hanging.

Salt Solution for Drying Meat and Fish
1 gallon water
20 ounces salt

Stir the salt into the water until dissolved.

Dip the strips into the salt solution right before hanging. This solution will add flavor to the meat, speed up the drying, and keep insects away. Suspend the meat strips vertically by the thickest end. Attach them to a line with loops of cordage of a small diameter if possible. Dried meat can then be stored in a breathable bag. You can eat it just as it is or rehydrate right before use.

SUN DRYING

Sun drying works best with fish, but the main concepts are the same for meat. Again, evaporating the moisture from the inside layers to the outside is absolutely critical. Remove the heads and guts and then split the fish right at the spine. Now you should have two pieces, side by side with the skin on top of each. From here, cut the fish into several equal chunks. Fish will generally dry more quickly than red meat, but still dip the strips into the salt solution. Dry the fish strips on racks, which you can easily fashion with two tripods and a cross stick.

The amount of time it takes to dry the fish depends largely on the humidity level in the air. When the fish is completely dry it should crack when you bend it. Test the doneness by bending a corner of the fish after it has been drying on the rack for a day. If you do not hear a crack, let it sit on the tripod for another half day before testing again.

JERKY

You can make **jerky** by adding a good salt solution and some spice to the meat, which is then dried over a low-heat fire of about 120°F. Cut the meat into lean, thin strips. Making jerky is different from salt drying because the goal is to dry the meat with an elevated temperature over a period of time. Hunters used this process long ago because it does not necessarily require salt or rubs (although those extras can give it a sensational taste), and it makes storage and transport so easy. They would eat all they could at the kill site and then dry the rest, which substantially reduces the weight of the meat. If done properly, a pound of meat will reduce to about 4 ounces in weight. When finished, the meat should crack when bent but not snap in half. It should be dry and not moist or greasy.

COLD SMOKING

The **cold-smoking** process is similar to making jerky in that you are cutting meat into thin strips, salting, and drying with an elevated temperature. Here, meat is dried at a temperature that is lower than what you use for jerky—about 85°F. You want a fire with lots of smoke to add flavor (and deter bugs). This method takes 12–24 hours in most cases.

COLD HANGING

In the winter, if the temperatures linger around freezing for a few days, meat can safely hang to dry. The cold temperatures ensure that bacteria do

not develop. In this process, the meat does not need to be deboned and cut into strips, but the animal must be completely gutted and opened with a cross stick in the breast so that the carcass stays open while it dries.

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TIPS AND TRICKS

1. Be sure to ITEMize any fruit before consumption because many berries are poisonous.
2. Salt can be a major concern for the longer term, but some plants contain enough salt that you can actually extract it by boiling them. Hickory is one tree that will provide salt if the roots are cut and boiled. Once the water has completely boiled away there will be a black substance left that will be salt. Animal blood is another resource rich in salt and many other nutrients. Note that when you extract salt from hickory you will actually be rendering mineral salt. That means it takes a lot to make very little.
3. Many fruits and plants also produce natural dyes. Raspberry will make red, goldenrod is deep brown, pokeberries make a purple dye, bloodroot is orange to reddish. Dyes made from berries can be soaked in a hot fixative of salt water, while most plants will require a vinegar for fixing.
4. Inks for writing can also easily be made from the same plants as dyes, and the color of the berry will generally indicate the resulting color. Pokeberries are the closest to India ink color. To make ink, macerate the berries (poisonous) in a pan or container. Add enough water to cover the material, which should equal about 1 cup in total, and slowly bring to a boil. Remove from heat, add 1 teaspoon salt, and if available 1 teaspoon vinegar, and simmer 15 minutes. Mix well to dilute the ingredients and strain the liquid into a storage container or bottle that can be sealed. Any large feather can be fashioned into a pen.
5. Anything that will ferment will eventually turn to vinegar. If you need vinegar as a fixative for something, a simple punch made from wild

berries can be covered until it ferments (turns to alcohol), then leave it in the open air for a couple weeks and it will turn to vinegar.

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Chapter 9
HIDE PRESERVATION, TANNING, AND CLOTHING REPAIR

"Whoever coined the saying 'an ounce of prevention is worth a pound of cure' must have been thinking about survival."

—Brian Emdin, *Survival Secrets*

If you are hunting and trapping during your time in the wilderness, you might also consider using animal hides to manufacture additional resources. Here you'll learn the methods for removing, fleshing, and drying hides as well as how preserved hides can be used.

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SMALL HIDES

Small hides from animals such as rabbit, muskrat, and fox are easy to manipulate and can be manufactured quickly. They tend to be too thin for most clothing articles but make sturdy small bags, pouches, quivers, and muffs.

CASING

Casing is a process of removing the hide from the carcass that works well for smaller animals. To case an animal, you remove the skin from the one side of the carcass to the other in one continuous piece, almost like a tube.

Casing a hide

FLESHING AND DRYING

Fleshing refers to the process of removing all the meat and membrane from the gut side of the hide. Cased hides dry very efficiently on a fleshing beam. **Fleshing beams** can be easily constructed with a large log and a homemade tripod. Find a log about 8" in diameter and strip off all of the bark. Use the tripod to elevate one end of the log. This process is essential because any meat left on the hide will go rancid. If you want to use a hide without hair, to make leather for example, then either pull off the hair during the fleshing process or soak the hide in ash water for a couple of days and then strip the hair.

Once the flesh is removed, you can fashion a small stretcher to dry the hide completely. Stretchers manufactured from wire are available commercially, but they can also be made from flexible saplings.

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LARGE HIDES

Large hides from animals such as deer can be split and sewn together for more involved projects like clothing and shelter resources.

SPLITTING

The most effective way to remove a hide from a large carcass is to split the hide. In this process you hang an animal upside down and cut the belly to open the hide with the gut side out. From here you cut across both inside back legs between the anus and vent or penis, and from there you basically strip the hide down off the carcass similar to the way you would pull off a shirt.

BUSHCRAFT TIP

Fleshing knives work well for removing the flesh from a large hide. These knives have a dull, hard edge and are available commercially, or you can use a split bone from the animal itself.

Once all of the flesh is removed, you will need to stretch the large hide on a rack. You can make a square rack from sturdy saplings; it should be at least one-third larger than the hide you plan to stretch on it.

Use your knife to make holes in the edges of the hide, about ½" from the edge so that the hide can dry without tearing. Use any type of cord to lace through the holes and stretch the hide on the stretching rack. Take care to preserve the original shape of the hide as you stretch it.

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RAWHIDE

When the hide has been fleshed and dried and the hair has been removed you will have rawhide. Rawhide can be used for many things.

RAWHIDE PRODUCTS

Rawhide is an amazing resource. You can get it wet, form it, and when it dries it will be hard as plastic. It can be used for anything from containers to knife sheaths. Many Native American tribes along the western frontier used rawhide envelopes or bags known as parfleches to carry things such as dried meats, supplies, and clothing. Rawhide can be cut into strips with shears like leather. You can even drive a sharp knife or axe into a tree stump and draw the leather through the blade to split it into two pieces. These strips can be used for lashing projects, twisted into bowstring, or even used for lacing if you slice them narrowly enough.

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MAKING LEATHER

From the point of rawhide, you can actually take things a step further into the craft of tanning. You will need to wet the rawhide once more so that it is flexible but not so wet that you have to wring water out of it.

BRAIN TANNING

To tan an animal hide you need tannins, which you can get from the brain of the animal. Heat some water in a pot over the fire but be careful that it does not boil. Cut off a little bit of the brain and mix it into the water very well so that it turns into a paste. Once the paste is ready, you will rub it onto the hide with your hands like a lotion. If you decided to leave hair on the hide, just make sure not to place this paste on the hair side. Once the paste is thoroughly rubbed into the hide, the entire piece needs to be folded up and kept cool for 24–48 hours. The tanning will do its job during this resting period.

After this waiting period it is time to rough the hide. During this process you will squeegee any moisture and material off the hide so that it begins to dry. Spread the hide out on your stretcher or fleshing beam and use a dull hand-scraping device. Once the hide is dry it will need to be stretched and broken by hand. You can tie a rope between two trees and drape the hide over it or hang it over a dull wood stake so that the fibers start to break. When the hide is completely dry and soft you will have garment-grade, brain-tanned leather.

You will need to waterproof the leather or else it will go back to hard-shell if it gets wet. Build a tripod around a small fire that only smolders so that it creates a lot of smoke but not very much heat. Drape the hide over the tripod and fire so that it becomes completely saturated from the smoke

and leave it there for a couple of hours. The hide will darken during this time. Take great care not to let the hide get too hot or scorch.

As you can see, making leather is labor-intensive, and keeping many hides in process at different stages makes things go easier. Either way, always be prepared with some manmade fabrics just in case you need something in the short term.

BARK TANNING

Bark tanning is a very complicated process and is not very practical if you are traveling light in the wilderness. I mention it here, however, because a lot of people believe that this is the only true way to produce real leather. This very old tradition was brought over by the colonists from Europe. The most complicated part of bark tanning is the time it takes and the size of the containers needed to accomplish it.

In this process you use tannins from trees such as walnut and white oak to tan the hide. Bark liquor is made by boiling large amounts of bark in three large batches of varying concentrations. The first batch is made very strong and then poured into a 15-gallon storage container. A second batch, a little bit weaker than the first, is poured into another large container. Then a third batch, the weakest yet, is made and poured into a third large container. It takes this much bark liquor for one deer hide.

Soak the hide in the first batch for a couple of weeks. During the first few days you must stir it often and then several times a day after that. The hide is then stored in the second batch of bark liquor for 4 weeks with the same stirring frequency. The hide is stored in the last batch for up to 12 weeks. Winter will be over by the time you get this far. At this point you still need to oil the hide, dry it, break down the fibers, and waterproof. You can see that although bark tanning makes the finest leather, it is a major undertaking.

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CLOTHING REPAIR AND REPRODUCTION

When you are out in the wilderness for a long stay there is no question that clothing may need to be repaired. The main purpose of clothing is to provide protection from the elements and environment. Damaged clothing cannot do this job well and will likely only get further damaged over time. In *Bushcraft 101* we discussed the importance of carrying a sail needle and cordage for clothing repairs. For longer-term outings, however, you will require more substantial clothing repair supplies in your kit. You should carry a couple of needles, multiple threads, possibly a small pair of scissors, and a bit of fabric material for patching. You need to think not just about repairs but also construction of new clothing to replace items that cannot be repaired.

Here are the items you should carry:

SMALL CLOTHING REPAIR KIT

- Three different sail needles of varying dimensions
- Several feet of small diameter #6–8 bankline or thread

EXTENDED CLOTHING REPAIR KIT

- Several sail needles in various sizes
- Several glover’s needles in various sizes
- Lock stitch awl with spare needles
- Several types of threads from waxed linens to nylon lines
- Scissors
- Shears for cutting thicker materials
- Stitching palm
- Small mallet or maul
- Spiked awl

- Beeswax
- Cloth tape measure
- Several square feet of canvas, wool, and cotton

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REPAIR STITCHES

Here are some basic stitches that should be useful for any clothing repair project.

LOCK STITCH

A **lock stitch** can be used to quickly mend holes along seams on heavier fabrics such as leather and canvas. The easiest way to make a lock stitch is with a specialized tool called a lock stitch awl, but it can be done manually also. Whatever the length of the stitch needed, you will require about twice that length of thread. Once the first hole is punched, pull half of the thread to the opposite side of the fabric. With the remaining length of thread, make a loop near the hole through which you've just passed your needle. Now pass the needle along with the thread through the loop and pull tight. Repeat this process, and when finished, all of the lock stitches will be on one side of the fabric. To finish, secure your stitching with a double stitch and then a few stitches in the reverse direction.

RUNNING STITCH

A **running stitch** can also be used to repair seams or hems on thinner fabrics like cotton. A running stitch is a simple in-and-out stitch evenly spaced in a line going through one side and coming back through the other with no locking thread. You can use this stitch to connect materials like sleeves to a shirt.

Whip Stitch

A **whip stitch** is used for seams as well and actually goes around the fabric fold in a spiral pattern, rolling the material as the stitch line progresses to create a welt. This is a good stitch for connecting two separate

pieces as well as finishing things like tarp edges and jacket seams. It is suitable for very strong material, even on hide materials, brain-tanned hides, and moccasins.

SADDLE STITCH

A **saddle stitch** is used mainly for heavy materials such as leather. It involves two needles, one on each end of the thread or cord, that pass through the same hole in opposite directions to create a locked running stitch. When using this type of stitch you will want to use a nonawl-type needle and prepunched holes so that the thread passes through the fabric easily without breaking.

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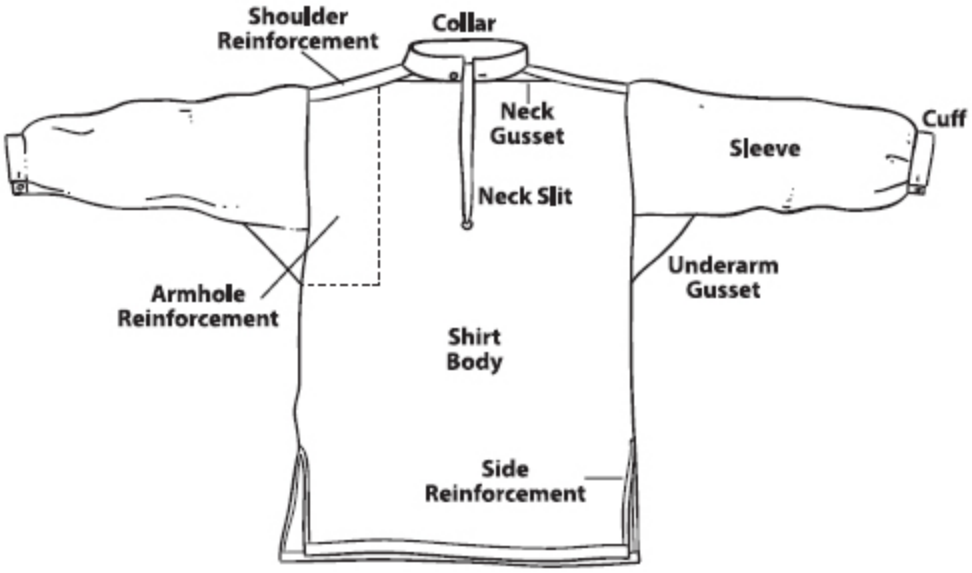
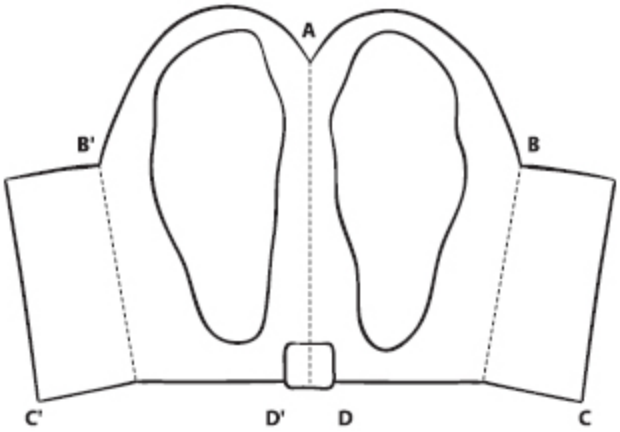
SIMPLE CLOTHING PATTERNS

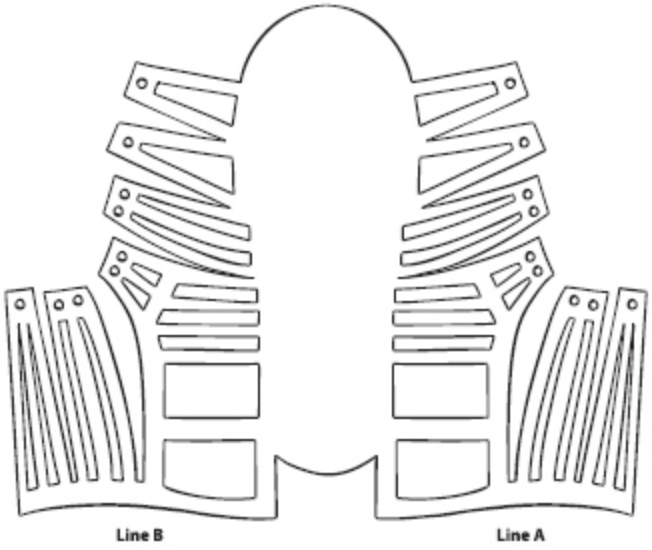
Here are some simple patters that you can use for clothing creation and repair.



Basic shirt pattern



Center seam moccasin



Roman sandal

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TIPS AND TRICKS

1. When drying the hair on cased hide it is best to turn the hide hair side out as soon as the raw side is fairly dry but not yet hard.
2. Hair removal will be easier if the hide is soaked in a solution of water and hardwood ashes for a few hours.
3. Shirt patterns can easily be altered to create a larger overgarment such as a blanket shirt. It can then be split down the center with a hood of two triangles added to make a capote.
4. Moccasins will wear quickly so use the thickest leather you have for bottoms and sew an additional sole layer to the outside if possible.
5. Any leather that is left from a project should be cut into lacing so that you always have spare and nothing is wasted.

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Chapter 10
WOODWORKING

“Give me six hours to chop down a tree and I will spend the first four sharpening the axe.”

—ABRAHAM LINCOLN

Woodworking is one of the most vital skills the woodsman can possess because it allows you to harvest from the largest natural resource in your environment. To our ancestors, the word *woodworking* was actually synonymous with the word *bushcraft*. As long as you have the proper metal tools, skills, and an understanding of different types of wood, you can craft virtually anything needed to sustain yourself over the long term. In the past, an entire family’s livelihood could depend on the woodcrafting skills needed to create items like shingles, stakes, besoms, and chairs. Those that weren’t used could be traded for foodstuff and groceries.

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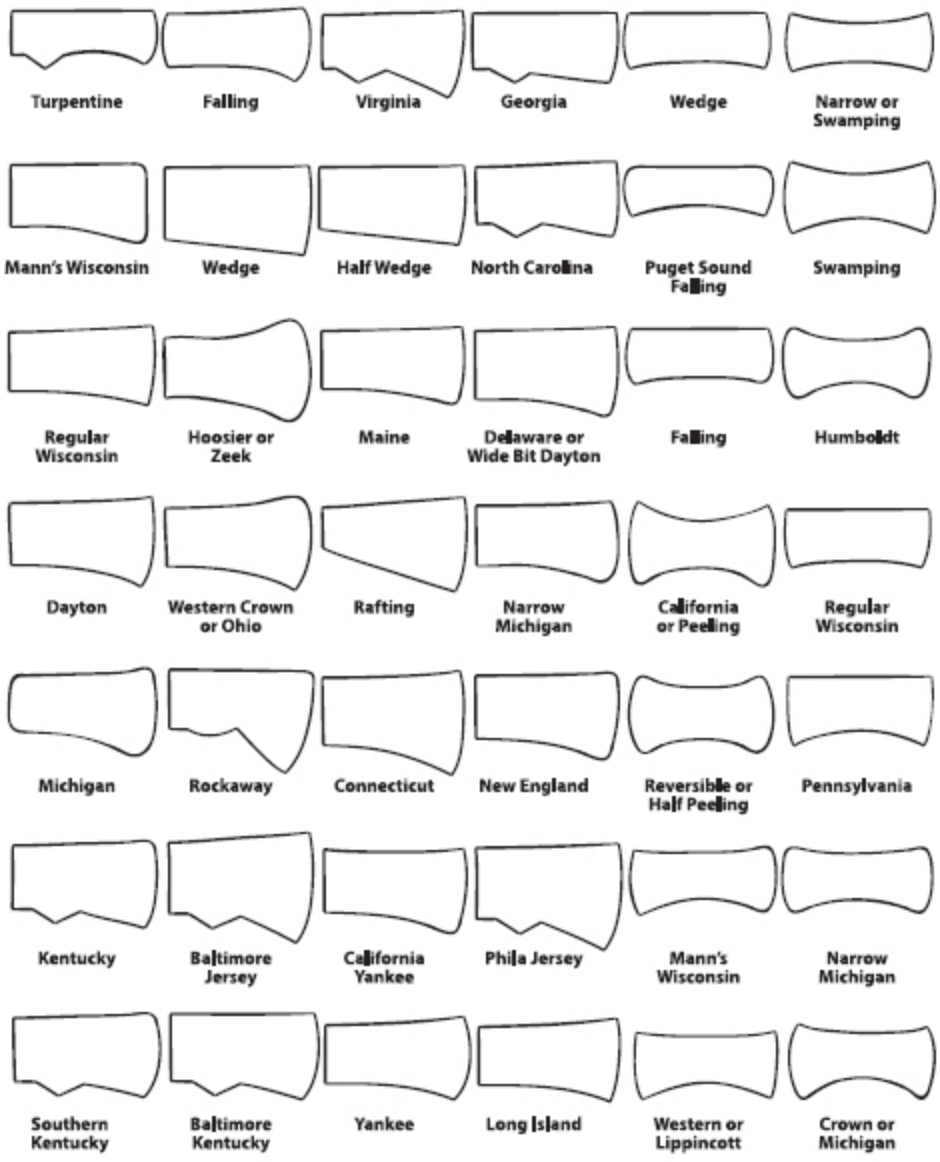
TOOLS

Following is a description of some of the most important woodworking tools to include in your kit.

FELLING AXE

A felling axe is a little bit larger than the usual model. At minimum, this axe has about a 3-pound head weight and has a 36"-long handle. This is the best tool for harvesting larger pieces of lumber.



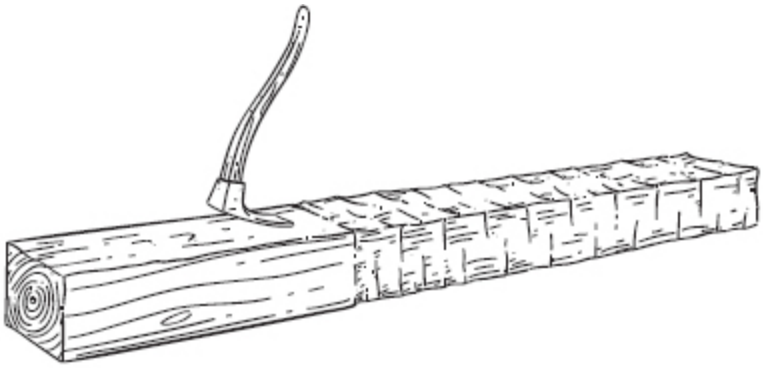
Axe types

BROAD AXE

The broad axe is the best tool for removing the last bit of material from the facing side of a log. It only needs to be sharpened on one side so that it can be used like a chisel. Sizes vary—some broad axes have smaller head weights and short handles, while others are very large. My suggestion is to carry a smaller broad axe and complement it with a larger adze.

ADZE

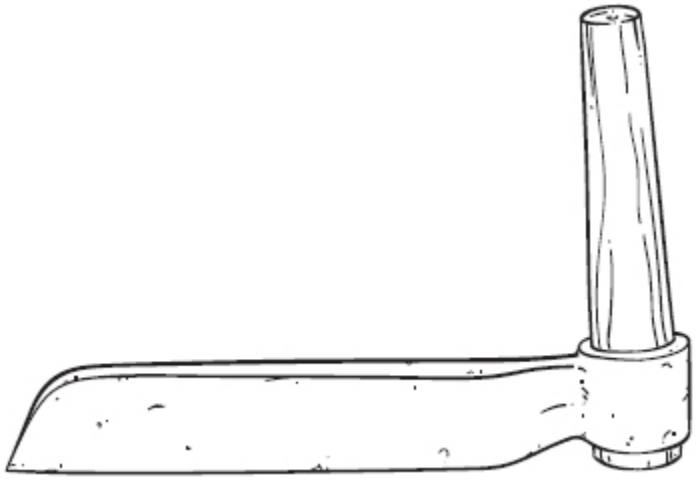
Adzes are used for flattening the sides of logs and truing the flats. An adze can be used in place of the broad axe in some cases because it works on similar logs but is more versatile. A curved adze can be used for many large-scale carving tasks such as hollowing out large basins or making dugouts.



Adze

FROE

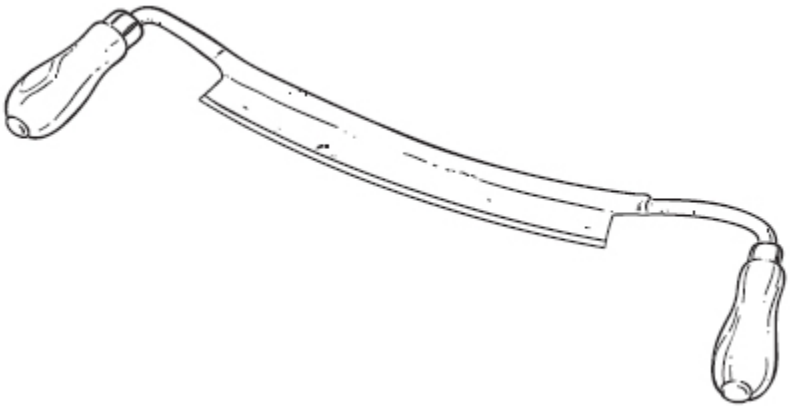
A froe is a long, flat blade with an upright handle. This tool is used to split lumber along the grain to create flat pieces of wood such as boards and shingles.



Froe

DRAW KNIFE

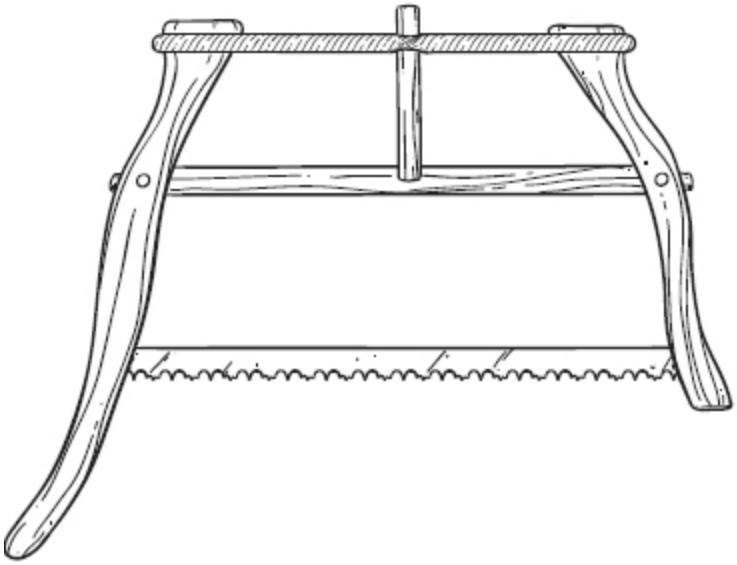
The draw knife is very handy when removing bark from a log, and it can also be used to further shape the wood.



Draw knife

BUCKING SAW

A large bucking or bow saw is used to break down longer logs when creating shingles and smaller lumber boards. The bucking is great for breaking down firewood as well. I recommend the 36" bucking saw.



Bucking saw

LOG DOGS

Log dogs are metal-forged U brackets. The sides of the U are right angles, which makes them look square in shape. These log dogs are used to secure a log so that it does not roll while you are working on it. Notch two smaller logs with V cuts and place the working log right in their cutouts. These V cuts will cradle the log. Then pound in the log dogs with a maul so that one end of the dog is in the working log and one end is in the cradle log at an angle.

Log dogs

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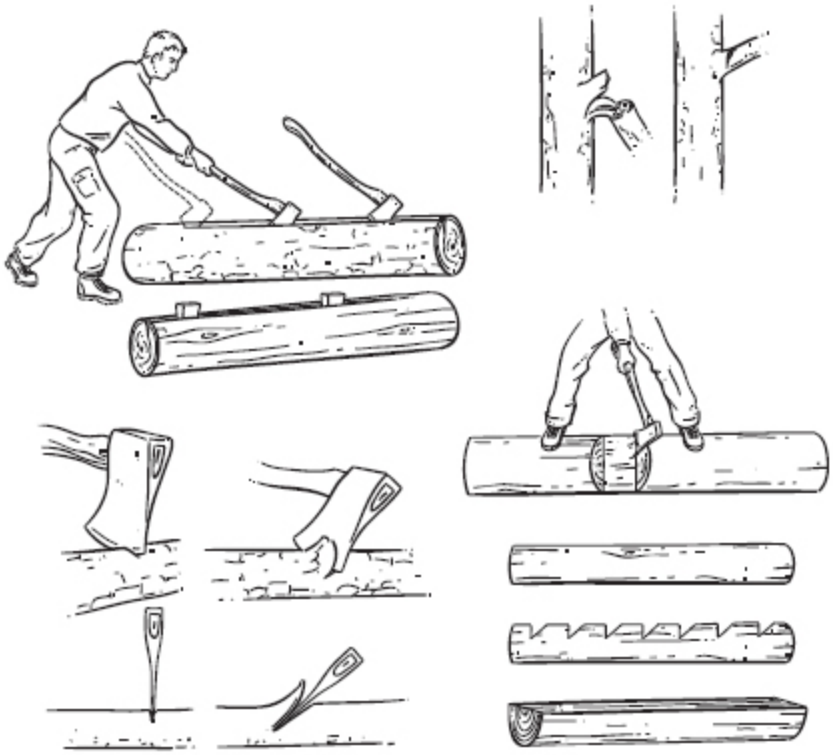
DIMENSIONAL LUMBER

It is often much easier to work with **dimensional lumber**. Dimensional lumber is wood that has been cut to specific sizes—for example, 2" × 4"—so that it can be used for building. You can make your own dimensional lumber using simple wood tools and a large axe.

PROCESSING A TREE TO CREATE LUMBER

Once you have selected a log for your project, lay it on the ground in your workspace. To make sure the log does not roll, cradle it in two smaller logs with log dogs attached to each end. Now you will need to hew the log, or square it. Start by removing a line of bark from end to end across the face so that you end up with the thickness that you need. Picture the front of the log as the top of a stump when you are squaring it. This gives you an idea of how deep to make that first cut. Clear the bark and pop a line, using string wiped with charcoal, from end to end. This will make your cut line clear and visible. Start by making a series of V cuts with your axe about 2' apart down that cut line on the face of the log. These V cuts should stretch the entire length of the log. Then remove these 2' pieces with your axe. When the job is completed you should have a rough flat surface on one side of the log. Remove the dogs and turn the log over so that the other side is facing up and reattach the dogs. You can use an adze to square the surface. Repeat this process three more times on the log and you will have one piece of square timber.



Making dimensional lumber

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WORKBENCHES

The original workbench was a simple knee-high stump. It seems like a minor amenity, but it provides a flat, stable surface for cutting, chopping, shaping, and anything that can be done with a one-handed tool. The stump vise previously discussed has several advantages and can be used a number of different ways. Many of these are used as bucking logs as well with a V cut channeled out horizontally and a wide kerf cut below the V. A kerf cut is a channel precreated like a jig from a saw cut. It is intended to guide the placement of the next cut. Then smaller materials can be laid within the channel and cut to length. The kerf cut is used as a guide for sawing off material like firewood.

Over time, the construction of these benches has advanced so that they include legs, which makes them more comfortable for sitting but less practical as a place to hang tools and cut wood.

PEASANT BENCH

This simple workbench includes a half-hewn log or flat slab with three or four legs attached. Eventually this evolved into what we now know as the shaving horse. Some peasant benches included a piece of rope that looped around the bench and held the work in place. The worker’s foot would hold the loop to the ground.

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BESOM

A besom is basically a broom. Old-time besoms were made from a number of different materials. They could be as simple as a whisk-like broom for the hearth or a full-sized floor broom to tidy up around the cabin. Today, European besoms are still made from hazel and small willow shoots. In the eastern woodlands, alder and birch make excellent besom heads. If you have access to an open field, a broom made from long grasses makes an ideal whisk. There are a number of methods for constructing a besom; here’s the easiest one:

You will need:

- A 10' length of strong cord
- A good, strong predried sapling of hardwood (like maple) cut to 4'
- Enough head material (such as grasses) to completely fill your hand so that only your thumb and middle finger touch

Align the tops of your head matter and trim the bottom to the desired length. You can even cut this at an angle if you wish to create an angle-headed besom. Once the trimming is complete it is time to wrap the bundle. The best way to do this is to wrap the cord around another stick that you can stand on to pull tension against the bundle as you wrap. Then release a bit of line at a time by lifting foot pressure off the stick. Start with a timber hitch and make several wraps about 4" from the top of the bundle. End this wrap with a clove hitch. Then drop your cordage down about 2" and make another wrap the same as the first. Prepare the handle by sharpening one end to a point. Drive the pointed end of the handle down through the top of the head with a wooden mallet until it passes the second wrap. You now have a besom that should last several months.

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AXE AND TOOL HANDLE REPLACEMENT

It is inevitable that tool handles are going to break when you're in a long-term camp. For that reason, you need to understand how to create and replace handles to extend the life of your tools.

Hickory is the preferred wood for straight tool handles. For bent handles, ash is the better wood. For shorter handles or for mauls, maple is a good choice. Handles are generally made from green sapwood. **Heartwood** within the handle may cause warping during the drying and curing process. Some shrinking will occur also, so make handles a little oversized in width. It takes several weeks for green wood to fully dry before the handle can be finally shaped and helved to the tool.

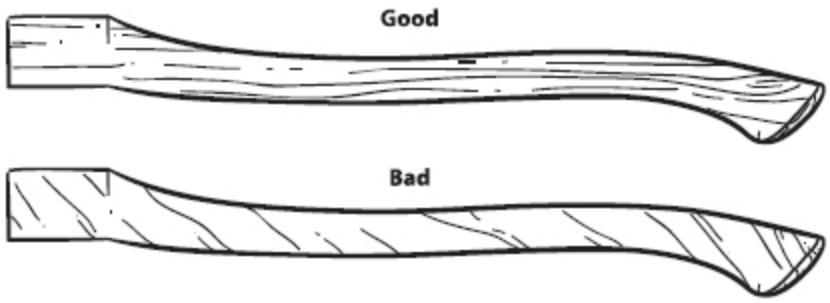
AXE HANDLES

Axe handles are the most common item requiring replacement at any camp. If you can make a good axe handle, all other handle types will be easy for you. Throughout most of history the axe handle was straight, but recently there has been a lot of speculation about the value of the curved dog-leg design and doe- or colt-foot design. Curved handles are helpful for carving-type blades. That said, there is no need to create extra work for yourself unless you want. A straight handle works perfectly with a single-bit axe, but experiment to see what you like in a design and determine what is most comfortable to you. I prefer straight handles for my larger axe and handles with a bit of an arc for my carving axe. All handles have an oval-shaped cross section so that they fit comfortably in the hand. Long handles should be thin so that when they are swung, weight is placed forward. Shorter handles should be thicker to ensure a solid grip.

When making a larger axe handle with a 2½-pound head weight or heavier, start with a hickory log that is about 10" in diameter and 30" long.

Split this log and quarter the halves. Then select the best ⅛ section to use for your handle. Next cleave the heartwood from the plank you have selected. If the material is still too thick, cleave it again. The rest of the quarters should be stored off the ground where they can dry out for later use.

For quick short axe handles, you simply need a hewing hatchet and a knife. For longer handles, a drawing knife will give you more flexibility to shape the handle. Start by squaring your wood as best you can, paying attention to the grain lines in order to ensure that the top of the handle has a good straight grain. If you still have the old handle, you can even trace it to make a pencil pattern right on the hickory wood. A shaving horse comes in handy when you are forming the shape of the handle. Don't forget to leave room for the piece to shrink while drying.



The grain of axe handles should run parallel to the wedge slot.

Axe handle

WEDGE AND HELVING

Before helving the axe you will need to saw a kerf cut from the top of the handle area to insert a wedge after the handle is in place. The wedge should be carved of hardwood and left a little longer than what is needed for it to be even with the handle. On the finished product you ideally want about ¼"–½" of the handle above the eye of the tool. Metal wedges are not

essential if the axe is hung correctly and then soaked in hot oil or tallow. Soaking the axe in oil after helving will make the wood swell and also seal it. I recommend that you coat the handle with birch oil after it is completed and hung. Add another coat each week for one month and then coat every month for the first year. This will help maintain the handle and keep it from cracking or drying out over time.

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MAKING A WOOD BOW

Before you jump into bow making, please understand that it is complicated. There is a vast difference between a quick bow that lasts a week or two and one that will last until the wood rots. There might be times when you need to manufacture something on the fly, but it is always nice to build a lasting bow. You will learn about both here.

Here are a few terms related to bow construction that you should know:

- **Limbs**—the portion of the bow that bends.
- **Riser**—the static part of the bow that sits in your hand.
- **Belly**—the side of the bow that faces you.
- **Back**—the side of the bow that is farthest away from you when you are shooting.
- **Shelf**—this is a rest for the arrow and can be cut right into the riser or can be added with a piece of bone or wood.
- **String nocks**—the portions at the grooved end of each limb that accept the bowstring and keep it from sliding down the limbs when the bow is strung.
- **Tiller**—the bend of the bow from tip to riser.

The limbs are the portion of the bow that bends, and the riser is static in the hand unless you are building a bow that is purposely meant to bend in the handle area. This works well with green sapling bows for quick use but also adds dramatically to hand shock.

QUICK SAPLING BOWS

Whichever bow you are building, it is critical that construction never compromises the outermost growth ring on the back of the limbs. This ring

will give the bow the greatest stability when it is bent on draw and will prevent the wood from splitting. For that reason, choosing the right wood is just as important as proper bow construction. Select a hardwood with a lot of fibers in the grain of the wood, which will add to the durability. Hickory, maple, and red oak are the most common woods used to make a bow. Find a piece of wood that is clear of knots and limbs. Use a sapling that is about 3" in diameter and 6' long. Mark the center of this piece with a knife cut right in the bark. Wrap your hand around the bow with the top of your fist positioned at that mark and then place another mark at the top of your grip.

Now that you have found the center, make sure not to remove any wood from this area. Examine the piece and see if there is already a natural bend in the wood that you can take advantage of. When finished, the profile of your limbs should be almost triangular with rounded corners. Sharp corners are prone to cracking.

When looking at the top and bottom of the riser, you will want the limbs to slowly taper from approximately 3" wide to 1" wide at the string nocks. Use your knife or axe to begin removing material in a slow taper from the riser down to the limb tips. Remember, the more wood you remove, the lighter the bow’s draw will be. You want a triangular shape that reduces the length of the limb from riser to the tip. As you go, check the tiller of each limb of the bow. You want the bend to be an even arc. Looking for the curve takes a good deal of practice, and you will probably break a few bows while you are learning. Tiller both limbs so that they bend about 3" in an even arc when you place the instep of your foot on the limb and push on the riser area.

Now it is time to string the bow and begin the final tiller of the bow. Using a string that has ten times the tensile strength of the bow draw you desire is important. For example, if you want a 50-pound bow, you will

need a string that has a 500-pound tensile breaking strength. I find that #36 bankline fashioned into two-ply cordage gives about 700 pounds of tensile breaking strength, which is plenty for any bow I would make. When cutting in the string nocks, be careful to make them only as deep as absolutely necessary and angle them at about 45° down toward the riser.

TESTING THE TILLER

To connect the bowstring and string the bow, use a solid loop on one end of the string like a bowline and an adjustable knot like a timer hitch on the other that can be secured with a half hitch. Step through the bow and bring the string up and around the limb tip at the top with the loop already seated in the lower limb nock. Brace the riser area against the back of the knee and bend the limbs equally. Do not try to get the bow to final bracing height. The actual distance of the string from the belly of the riser is usually about 6"–7" at this point. Just string it tight enough for the bow to bend about 3". After this, you can begin to exercise the limbs by slowly drawing the bow with no arrow, a few inches at a time, yet never to fully drawn yet. At this point you are just breaking in the limbs.

The best way I have found to examine the tiller while in the field is to sit on the ground and put the riser of the bow under the instep of your foot. Pull the bow with both hands and look over both limbs as they bend. If the tiller is off and one limb is bending more than the other, you will need to remove small amounts of material from the belly of the stiffer limb. Take care not to overdo it because you will end up with a bow that is too lightweight. After the bow has been stretched about 50–100 times and the tiller appears to be good, you should tighten the string to a brace height of about 5". Start the process of flexing and checking the tiller again. If the bow is too stiff again, remove more material but be careful. If it is good and you complete the exercise process, then you can go to full brace height or

6"–7". The end goal is for the draw to be good enough to hold at full draw until the count of ten. Make sure the tiller is even on both ends.

Remember that at this point you have a green-wood bow and it will take on a permanent bend very easily, so take off the strings when you are not using it. Let the wood dry naturally, and it will eventually mature into a pretty good bow. As it dries it will get stiffer, so eventually you will need to seal it with oil to prevent further drying and possible cracking.

PERMANENT WOOD BOWS

The wood selection process should be the same for a permanent bow. Generally you want to harvest the wood in the spring. Split the log four ways and then you have four possible bow staves. Remove the bark and keep the wood dry and off the ground for at least four seasons. Once the staves are dry, select the best one that does not have any knots or twists. Once the wood is dry, a draw knife, heavy horse hoof rasp, and a shaving horse might come in handy. When working with dry wood, you might actually want to carve a riser and shelf right into the wood. Then carve a flat side into the arrow side of the riser with a small shelf for the arrow—about ½" for the riser and ¼" for the shelf is plenty.

Since the wood is dry, it needs to be treated with great care during this process so that it does not crack. Seal it immediately with animal fat or tallow. Again, never store a wood bow in the strung position; always unstring and lay horizontally across two pegs or forks. Avoid excess heat or direct sun on the bow.

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MAKING ARROWS

It is not overly complicated to make arrows. You will need wood, cane, or bamboo between ¼" and ½" thick and about 3" longer than your full draw length. Collect and bundle the shoots with string to help keep them straight while they dry. Once the shoots are dry, remove the bark and check for overall straightness. Heat any crooked areas over the fire and bend them into place with your hand.

Next you will need to choose a hunting tip for the arrow; your selection depends on how you plan to use it. A fishing arrow can be carved into a gig. An arrow for small game can be carved to a fairly blunt point and fire-hardened in the ash and coal below your fire. You will want the largest end of the shaft to be the front. Now it is time to set up the string nock. This will also need to be carved or cut into the arrow. A deep, rounded V will work if you do not have a saw or the ability to carve a nicer notch. Once you have a notch, you can begin to tune the arrows. You might make a lot that do not shoot well. The weight or bend in the shaft might have something to do with this. Select the best ones—the ones that fly about 8–10 yards—and fletch them. Fletching an arrow simply stabilizes the flight path over distance (you do not need to do this process for bow-fishing arrows because they only need to travel a very short distance).

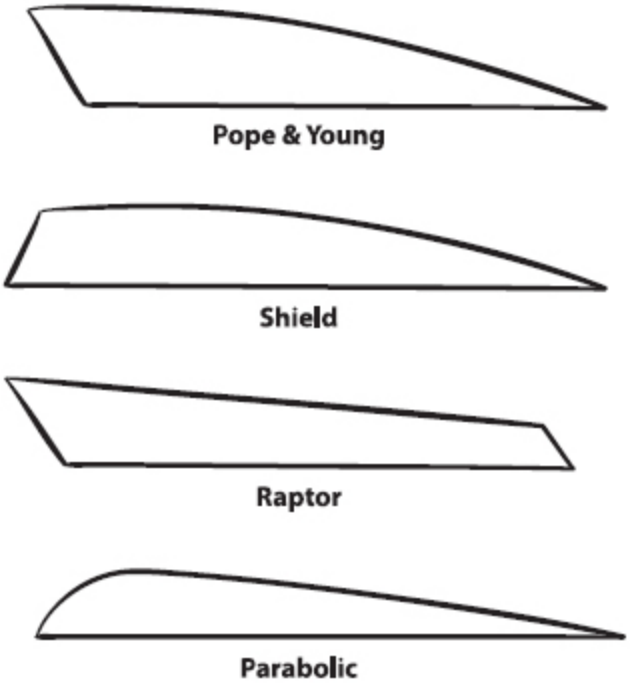
FLETCHING

Fletching is the process of attaching a fletch, usually a feather, to an arrow. You can improvise with duct tape, but feathers really work best. Collect any feathers you see while you are walking around or harvest them from any fowl you kill for food. Feathers from larger bird species such as turkey and goose work best for this. If you use a standard three-feature fletch, make sure the features come from the same wing because there is a

natural bend, called a **helical**, to every feather on the wing. Tail feathers do not have a helical bend, but you should keep those together with their kind too.

You can attach the feather by tying it on with a thin string or using adhesives. It is always a good idea to wrap the area of the arrow that you have notched for placing the string. This ensures that it will not split apart when the arrow is shot. I have found that a leather jig works best for securing the arrow, no matter how it is attached.

Take a 3" square of leather or bark (such as birch) and draw a triangle on it. Find the center point of the triangle and make three slits from the center to the corner of each point. Slide this over the arrow shaft and it will guide you for attaching the feathers. I generally use feathers about 4"–5" long, and they can be cut in any pattern you choose, but wider feathers will slow the arrow’s travel more quickly. Large feathers, called flu arrows, are used to keep arrows from traveling long distances in flight when they are being used for aerial or close ground targets. To process the feathers, split down the quill of the feather, which is best done by separating the feather at the top and tearing in opposite directions. This can be done with a knife as well. Once the feather is split, trim it to the desired size and shape it with about ¼" of shaft left bare on both ends.

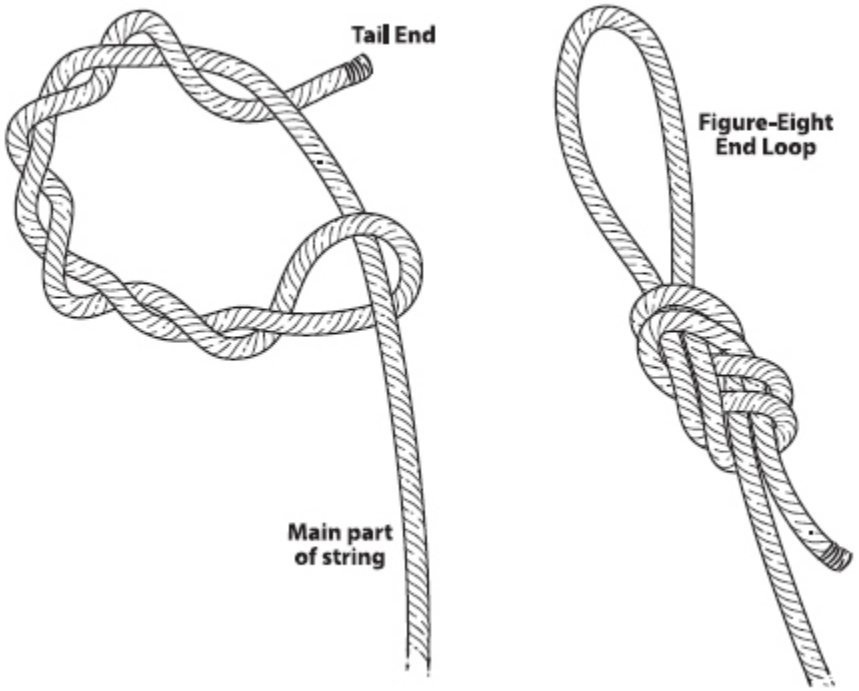


Fletching

The feathers are then fed through the leather guide and wrapped first at the front toward the arrow tip. They can then be glued or wrapped along the length by moving the guide toward the back of the arrow. Then the butt of the arrow is wrapped with about ½" between the nock and the beginning of the fletching.

STRINGS

As mentioned, the string must be ten times the breaking strength of the bow's fully drawn pull weight, but there are many options for strings: Artificial sinew, bankline, rawhide, and paracord are all options. Just be sure you understand how many strands of each will need to be corded to make a safe bow. To figure this out, you must know the tensile strength of your material.



Bowstring and knots

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TIPS AND TRICKS

1. If you need a simple pot scrubber, take some broom sedge, fold it in half, and wrap it one time as you would a besom at a point about ½" from the top. Cut it to about 3" total and you will have a great pot and pan cleaner.
2. If you are not sure about the wood density or hardness of the wood you are working, place it in water. Softwoods will float high in the water, while some hardwoods will actually sink.
3. When working with thinner wood or pieces with a smaller diameter, make sure they are fairly dry; otherwise, they will crack over time.
4. Bows should never be left in a vertical position. Always store them horizontally without their strings and with two supports under the limbs.
5. When shooting a bow, mechanics are everything. Be sure to use the same anchor (the location where the draw stops). Like a finger touching a tooth, this will greatly improve consistency.

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Chapter 11
BLACK-SMITHING

“I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived.”

—HENRY DAVID THOREAU

In the old days, the blacksmith was one of the most important people in every village. He alone could manufacture parts for tools such as axes and chisels as well as weapons like knives and swords. Iron was created by smelting in a blast furnace with extremely high temperatures that could liquefy the metal. The liquid ore would run from the bottom of the furnace. In the beginning, this liquid would be diverted into channels in the sand with finger channels emanating from the main channel so that once cooled it could be broken down into manageable pieces. It was said that this configuration resembled a sow laid on the ground suckling piglets; this is where the term “pig iron” originated. This iron was high in carbon and too hard for forging, but it could be remelted and poured into molds, creating “cast” iron. Wrought iron was produced by melting iron in a special furnace and stirring it to remove impurities and carbons. It was then taken from this furnace in a clumped mass and hammered under steam or water to form large lumps of hand-worked iron that could be forged by hammer and anvil.

With all of these methods, the blacksmith was like an engineer. He needed to make precise tools that would aid every member of society from the farmer to the doctor to the hunter and trapper. The ability to manipulate metal has always been a mainstay of survivability.

Today blacksmithing is an endlessly valuable skill that allows you to both repair and create a wide array of resources in the camp setting. If you are in the position to carry blacksmithing tools on your trip, it will be helpful for you to have a basic knowledge of the craft. Here we will discuss the basics that can be most helpful for long-term excursions but will also be convenient for small, quick projects.

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BLACKSMITHING TOOLS

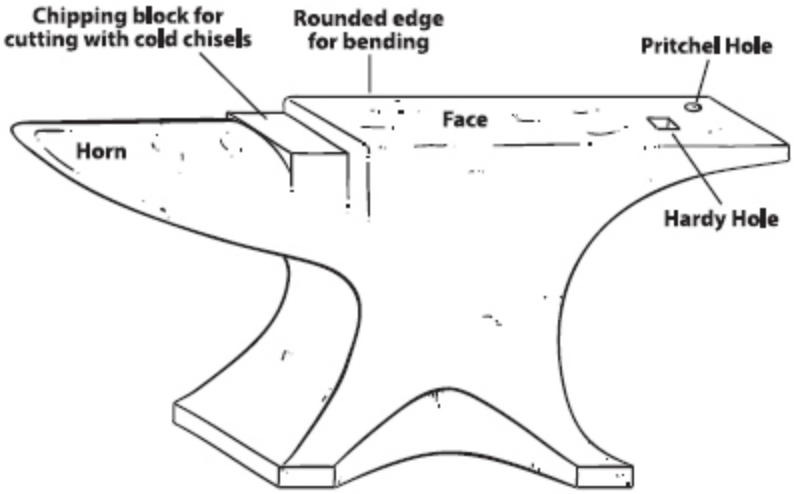
Most of the essential tools for small blacksmithing projects can fit into a 5-gallon bucket. Use a metal bucket so that you can repurpose it for quenching as well. Here is a checklist of the most common and useful blacksmithing tools that I recommend keeping in your bucket:

- Anvil
- Hammer
- Bellows
- Forge and fuel
- Pliers or tongs
- Chisel
- Grinding stone
- Sand
- Hardy hole
- Pritchel hole

ANVIL

An **anvil** is a hardened flat piece of steel surface upon which you can hammer and form hot metal. A small piece of railroad track works really well as an anvil and can be fashioned with a horn and hardy hole ahead of time. The **horn** is a conical shape attached to the front of the anvil that can be used for forming rings and circular shapes. The **hardy** can be used as an attachment point for other tools like bending forks. If you are not able to source a piece of railroad track, any large chunk of hard steel will work. Even a section of I-beam or other hard steel such as an engine block will do —something that will serve as a hard, flat surface. I would recommend a small block of steel at least 6" × 6" and 2" thick. There are also stump

anvils available that drive into a stump; you can even drive a large metal wedge into a stump and use it as an anvil.



Parts of the anvil

HAMMER

A cross-peen hammer, a heavy ball-peen hammer, or a 1½-pound sledge are very useful because they are the most versatile. In extreme cases you could use your axe as a hammer, but you risk damaging the axe or malforming the eye.

BELLOWS

It is best to carry a hand bellows, similar to those used for a fireplace, but you can also improvise this tool. Fanning the forge is what maximizes the heat so that it is possible to bring the metal to forging temperatures. It is possible to fan the fire with a bucket lid or other flat fanning object in a dire emergency, but that will get tiring. If there is a steady breeze, you can build a fire pit in the open and then place a wedge-style tarp at an angle with the back corner set up to force air into the pit like a funnel. Animal skins can be

fashioned to create air bags when combined with a tube of bamboo or pipe to force air into a forge as well.

BUSHCRAFT TIP

If you don't have access to coal, you can create charcoal from hardwoods used for forging exactly the same way you make any other charred materials. To do this, you will need a large container as well as a very large and long-burning fire. An alternative is to use normal hardwood in a fire pit and build a large coal bed. If you have forced air, a slit trench–type fire works well here. You can also make a trench above ground with large piles of sand, dirt, or rocks on each side to hold heat better from thermal mass.

PLIERS OR TONGS

You will need something to hold your piece while it is in the forge. A good set of **locking pliers** or a set of heavy **lineman's pliers** will work well for small projects. For larger projects you will need at least one set of **multiple jaw–sized tongs**.

CHISEL

You will need at least one good hot-cutting chisel to cut off metal when heated before you shape it. Other tools along these lines include a couple of punches for drifting eyes in tool heads or punching smaller holes for pinning.

GRINDING STONE

Some sort of rough and fine grinding stones will come in handy for final shaping. These should *not* be the same stones you use for tool maintenance. Natural stones of different grits can be used in an emergency for this process, especially before the metal is hardened.

SAND

Some clean sand will come in handy if you can get the metal to welding temperature, which is white-hot. The sand will be used as a flux for forge welding.

HARDY AND PRITCHEL HOLES

Many anvils have two holes in them: The hardy is square and the pritchel is round. The hardy is used for attaching tools such as cutoffs, bending forks, and cones. The pritchel is for the punch to pass through when punching holes.

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SOURCES FOR METAL

You can search around places like old homesteads for scrap melding to be used for your projects. Metals are not all the same, and what you need will depend on the project. As you're searching for materials to repurpose in your blacksmithing efforts, keep an eye out for the following types of metals.

MILD STEEL

Bar stocks and sheet metals are considered mild steels. Nails from fences or old pallets will make good small stock for pins, fishhooks, etc.

MEDIUM-CARBON STEEL

These are harder to locate unless you can locate a junked farm vehicle, but shafting and plow blades are good sources for this type of steel as well as rebar.

HIGH-CARBON STEEL

This is the hardest to come by and, in most cases, the most desirable. It will be your tool steel for making knives, etc. Coil springs, leaf springs, saw blades, old files, Allen wrenches, and any other small tool will most likely be made of high-carbon steel.

The numbers on the chart denote the steel grade and certification system:

RECLAIMED MATERIAL CHART FOR BLACKSMITHING

APPLICATION	NUMBER/LETTER
Agricultural steel	1080
Axels	1040
Ball bearing balls	52100
Ball bearing races	52100
Band-saw blades	L-6
Bits, router	N2
Bolts, anchor	1040
Bolts, heat-treated	2330
Bolts, heavy duty	4815
Brake lever	1030
Cams	A6, S7
Chisels	O2, O6, L6
Clutch disk	1070
Clutch springs	1060
Coil springs, auto	4063
Coil springs, truck	5163
Cold-rolled steel	1070
Connecting rods	1040
Crankshafts	1045
Cutters, bolt	S2, S7
Drifts	L6, S2, S7
Drills	N2
End mills	M2
Fan blades	1020
Files	W-2
Gear shift levers	1030
Hammers	L6
Harrow disk	1080
Hay rake teeth	1095
Jackhammer bits	S5
Knives, machine	M2
Knives, woodworking	O2

Leaf springs	1085, 5160
Lock washer	1060
Mauls	L6, S2
Mower knives	1085
Music wire	1085
Nail sets	L6
Plow beams	1070
Plow disk	1080
Plowshares	1080
Pneumatic tools	L6, A6, S7
Punches, cold	A2, O2
Reamers	M2, O2, A2
Roller bearings	4815
Screwdrivers	L6, S2
Snap rings	1060
Spring clips	1060
Spring steel, clock	1095
Steering arm bolts	3130
Taps	M2, O2
Transmission shafts	4140
Tubing	1040
Universal joints	1145
Valve springs	1060
Wrenches	L6, S2

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WORKING WITH HARD METAL

When working with metal, you need to understand how to make it hard and how to make it soft. This process is a bit more complicated than just heating and cooling the material. Metal needs to be heated to a certain temperature/color and then cooled at a certain rate. Many tool steels will also need to be tempered to control how brittle they are so that they can be sharpened.

NORMALIZING

When you begin to work with high-carbon steels, especially when you're making things such as files, it is best to **normalize** them, or bring out some of the hardness, so that they are not brittle. To do this, heat the metal to working temperature and then let it air-cool before heating and forging again.

ANNEALING

This process softens a hard metal such as high-carbon steel so that it can be worked more easily by hammer or grinding. In this process you will heat the metal until it turns bright orange and then place it in some medium such as the cool ashes from an old fire or warm sand where it can cool naturally. Another method is to build a fire and place the metal to be annealed at the bottom of the fire. Use the fire for cooking and other camp activities, then allow it to cool overnight. Retrieve the metal in the morning when the pit has completely cooled. At this point, when it has cooled, your metal will be as soft as it can be. This process can be especially important if you are making knife blades from high-carbon steel. It is done after forging the initial shape so that stock removal can be easily accomplished to form the final profile and grind. The tool is then heat-treated and tempered.

HEAT-TREATING

Heat-treating metal is necessary to achieve the desired initial hardness of the metal before tempering. When metal is heat-treated it must be be taken to a certain color or tested with a magnet to make sure it has reached a nonmagnetic state. Then it will be quenched in a different material depending on desired hardness.

QUENCHING

For a metal to become as hard as it can truly be it needs to be quenched (dunked) in water or some other liquid when the proper color is achieved and then left to cool. Be careful because sometimes this process will make the metal brittle too. Fire steels are generally quenched in water. Oil is a common quench material for most projects, and motor oil will work fine for this if you can find it.

TEMPERING

Tempering steel is a bit of an art. This process requires you to read the color of the metal. When you temper a metal you soften it from its hardened state either in part or in whole depending on the tool. To temper a piece of metal in a forge fire, place the project in the coals of a fire and watch the color change as the material heats up. For example, if working with a knife blade, you would place the blade in a position with the spine against the coal bed and the blade upward. The color of the spine will turn a bluish color. As this color rises to the blade edge, the edge will become a straw yellow color before turning blue. At this point remove the blade and quench it in oil to stop the heating process. The blade is now tempered.

TEMPERING COLORS

TOOL	DESIRED COLOR
Wood chisels	Pale straw yellow
Hammers	Straw
Drilling tools	Dark straw
Cold chisels and punches	Purple
Springs	Pale blue

MAKING KNIVES

It is easiest to make knives from an existing blade such as a round saw or wide band-saw blade. The beginning shape can be hot cut after the piece is normalized. A full tang knife that will last a lifetime can be fashioned in fairly short order by minimal stock reduction after annealing. Two holes will need to be punched in the handle while it is hot prior to heat-treating and tempering. These holes will be used to pin the handle in place. The final edge should never go on until the very end of the project. Tools such as saw blades and files are already very hard, and many can simply be snapped off to length by bending or striking them with a hammer on the side of the anvil. Fashioning a rat-tail tang knife from a file is one of the easiest ways of making a viable blade and a good starting project to get used to working the metal, heat-treating, and tempering.

MAKING AN AXE

Making an axe from flat stock is a bit more advanced in skill because it requires forge welding to accomplish it correctly. However, you can use an existing tool head such as a ball-peen hammer or roofing hatchet, and then forge to shape it. You will already have the eye and just need to form the blade to the desired profile. Remember that the major difference between an axe and a tomahawk is the way one is mounted to the handle. The tomahawk will require only a rounded eye into which a stick can fit. An axe

will require drifting; this means you will force a hole through hot metal with a punch where the handle is wedged into place and inserted from the bottom.

MAKING A FIRE STEEL

To make a fire steel for flint and steel is an easy process; you must, though, use high-carbon steel. You will need to anneal the material first and sand or grind a good clean edge on the striking surface. You can shape the striker in many ways but a typical C is the most common. Once the form you desire is achieved you want to heat the metal to a glowing yellow (not forging heat). At this point quench only the striking edge in water for several seconds, then submerge the entire tool. When finished it should throw sparks well. If not, you did not get the metal hard enough or it was not high-carbon steel. Files make the best strikers. You can always reheat and try again.

BUSHCRAFT TIP

Forge welding is a true skill and takes time to get it right. In forge welding you are heating metal to almost the melting point and then forcing it together with sudden impact while it is still in this near-liquid state. It is amazing to see, like a sparkler show on the Fourth of July. Before attempting this weld you will need to clean the surfaces to be welded with a wire brush, if possible while they are orange-hot. Then add sand for a flux before the final heat to weld.

Now get the metal almost white-hot. It will appear very bright yellow, and a few sparks should be coming from it. Be careful

because if you wait a few seconds too long, you will melt off the work in the forge and all will be lost.

Once the welding heat is attained it is critical to get the piece or pieces to the anvil and strike several times. Don’t smash the metal with heavy blows; just pound hard enough to compress it when in this near-liquid state. It may require a few more orange/yellow heats to complete the process, but to be effective, a good weld should happen on the first time.

These are the colors you are looking for in the metal when doing forging tasks to form the materials:

FORGING COLORS

COLOR	MATERIAL
Dull red	Hardening or annealing high-carbon steel
Medium red	Hardening or annealing medium steel, minor bends
Bright red	Annealing mild steel
Orange/yellow	Forging high-carbon steel, hot cutting
Yellow	Forging medium steel
Bright yellow	Forging mild steel
Bright yellow (throwing a few whitish sparks)	Welding

OTHER USEFUL ITEMS FROM THE FORGE

- Nails
- Log dogs
- Froe
- Auger
- Raft dog
- Squirrel cooker

- Fire irons
- Hooks
- Holdfasts
- Adze
- Wood chisels
- Mortise chisels
- Brace

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Chapter 12
CONTAINERS AND CONVEYANCES

“Climb the mountains and get their good tidings. Nature’s peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you, and the storms their energy, while cares will drop off like autumn leaves.”

—JOHN MUIR, *OUR NATIONAL PARKS*

Maintaining a longer-term camp will require restocking with supplies or maybe even moving locations, and for that you’ll need containers and conveyances. Here you’ll learn to fashion your own, from simple water containers to firing your own clay pots to building watercraft. I grouped containers and conveyances together in one chapter because they both relate to transportation: one to the transportation of goods and the other to the transportation of food.

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WATER CONTAINERS

Water containers should be of such material that you can use them to carry water over a distance and also as cooking vessels at camp. Metal tends to be the best option because it can be placed right into the fire. You can also fold over a simple piece of canvas, sew it, and create a container to carry several gallons of water over a distance. Rawhide can be fashioned into a container by a process called **stone boiling** (see the next section). You can also carve and burn containers out of wood. Throughout history, wooden bowls and trenchers have been used for all kinds of liquids. The kuksa, or Sami, cup was carved or burnt from a burl of a birch tree.

POSSIBLE WATER CONTAINERS FOR CAMP

- Birch bark
- Any bark harvested in the spring
- Wood
- Rawhide
- Stomachs of animals (better for carrying than cooking)

BUSHCRAFT TIP

To make a burn container, start a fire on a flat wood surface. Control the circular burn to drive deeper into the material by alternating between burning and scraping the raw material, burning and scraping again, and shaping it into a container.

STONE BOILING

Stone boiling is a process for disinfecting water or cooking food without a metal or nonflammable container. To stone boil you will need to heat

rocks in a fire until they are glowing hot and then transfer them to the container of water in order to bring it to boiling temperature. Avoid using rocks found near water or porous rocks such as limestone. Look for rocks that are about fist size or a bit smaller. You can use much smaller rocks if that is all you can find, but know that they will not work as efficiently. Remember that the stones will displace the water, so the size of the container you use will dictate what you can do here. If there is a chance that the container you are using may burn, lower the rocks into the water and hold them for a few seconds before dropping them.

Stone boiling is a messy process and can be dangerous. You will need a good set of tongs or a Y branch with another stick that you can use to manipulate the rocks. Guide the rocks with the plain stick into the Y branch so you can hold them. You need a clean boil, so take care to knock any ash off the rock once it is lifted from the fire before placing it into the container. I have used many different containers, from dry bags to safety helmets, for stone boiling. Almost anything works fine as long as you are careful. Even natural containers will work if you have the time to manufacture them.

You can even use a waterproof tarp to line a hole in the ground and then boil in the pit. Food can be boiled this way too, but it might take a couple of boils for the food to cook properly. Just make sure that the stones are dry and clean from any mud and debris. Get a large fire going with a good bed of coals. Place the rocks on the coal bed and build more fire on top. When the stones glow red, they are ready for use.

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BASKETS

Baskets are a fantastic choice for carrying any materials that are not liquid. For thousands of years people used large pack baskets to carry their entire camp! The only limitations are the gaps between the weaves and the size of the basket. A small basket can be used for collecting edibles. Baskets can also be used for certain traps.

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CLAY VESSELS

Fired clay vessels are another type of container that has been used for thousands of years. The process for making clay pots is very simple, but every step must be followed carefully and completely because the smallest misstep can compromise the vessel's integrity during and after firing.

PROCESSING CLAY

First you will need to collect a quantity of clay. Unless you are in a clay-based soil area, you will need to go hunting for this. Dig in the mud around creek beds and riverbanks to look for a slick and tacky mud layer. Roll this material into a ball to see if it stays together without cracking too much. If so, this material likely has some clay. Clay can appear in different colors from red to gray to white.

Once you have collected what you believe to be the purest clay, place it in a container of some sort. Back at camp, lay out the clay on a tarp and dry it completely in the sun. After it is dry, crush it as fine as possible and then sift through it with your hands or push it through some mesh to remove any impurities such as stones, sticks, or grass. Remember that a single blade of grass left in the clay can destroy a pot during the firing process. The moisture from the grass will evaporate during the firing and blow a hole in the side of your pot!

To turn this crushed clay into something that can be molded, you will need water and a binder. The binder is what adds some rigidity to the clay and makes it formable. Dry cattail fluff, crushed shell, and sand make excellent binders. Mix the clay, water, and binder together a handful at a time on a flat surface or a stump. About one-third of the mix should be binder; add just enough water to make the clay easy to mold so that it does not crack during the pot-making process. You have reached the correct

consistency when you can roll out a pinky-sized coil and tie it in a loose knot in an over-and-under fashion without cracking it. Wet your hands with a little bit of water to smooth out rough areas of the pot. Make sure there are only rounded corners and never sharp angles. Once the pot is formed it should be left in the sun or set close to a fire until it dries thoroughly.

BUSHCRAFT TIP

Coil pots are attractive and easy to make. Start with a flat round of clay similar to a pancake. Roll a long tube out of the rest of the clay and then wrap it around the base as coils, stacking them until you reach the desired height. Smooth the inside of the pot using some water on your fingers. To make a pinch pot, start with a ball of clay that is suitable for the size pot you need to make. Place your thumbs into the center and progressively pinch the clay all around, pinching and pulling the clay between your thumb and fingers. Keep pinching and pulling outward from the center, forming the pot until it reaches the desired size.

FIRING CLAY

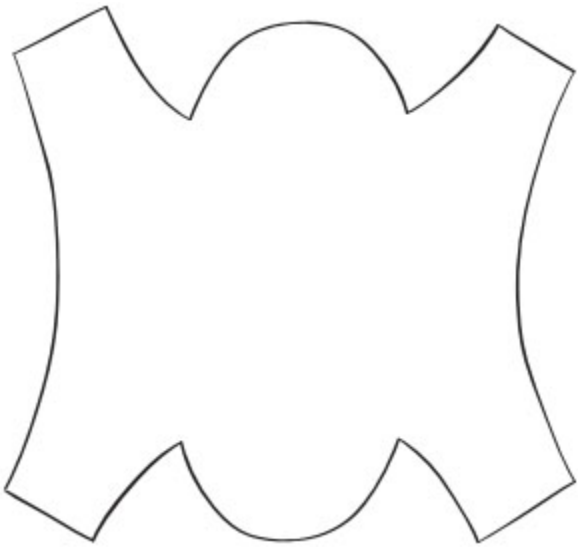
Once the pot is dry both inside and out, top and bottom, it is ready to be **fired**. I have found that resinous woods like pine work very well for this process because they fill the pores of the pot very efficiently and create a kind of glaze over the finished product. Start by putting your pot in the center of the area where you plan to build the fire. Try to elevate the pot from the ground with a platform of sticks. Next build a fire around the pot, engulfing it in heat. Be careful that a large log or stick from the fire does not fall on it during the firing. Use lots of smaller sticks because this fire will need to burn for a couple of hours. After that, let the fire extinguish

completely, burning down to ashes and cooling before you attempt to disturb or remove the pot. It’s very easy to break pots in the process, so my advice is to make several at a time to ensure that at least a couple survive. Do not even think about adding handles at this point! Keep them simple because you will have greater success.

JACKWARE

Leathers can also be fashioned into containers called **jackware**. First draw a simple pattern similar to the bottom of an hourglass with a 2"-long neck and 1" width. Make two holes on either side of the container so that you can add rope handles later. Leave extra room for a double row of stitches all the way around the leather, except at the opening. Use the pattern to cut out the leather; then get it soaking wet so that it can be formed. Sew the container so that only the opening at the top of the neck remains. Then fill the formed and sewed container with sand that has been heated in the fire. Pack it in very tightly with a ramming stick (any stick about 1" in diameter will do). Pack the sand to the very top of the container and allow it to dry for a few days. Once it is dried, pour out the sand and rinse the container quickly just to remove any remaining particles.

Pour melted beeswax down the inside seams of the container to seal it tight. You can even make a stopper out of wood if you want to secure it closed. You can also now add your rope or strap for a handle.



Cup pattern

GOURDS

Gourds cannot be found in the wild, but you can plant them at a permanent shelter or search for them around an older farmstead. Native Americans and pioneers alike used gourds for camp items such as containers, ladles, and cups. Gourds come in many shapes and sizes. Once they are dried, sand or scrape the outer skin from the gourd, cut it open, and scoop out any membranes and seeds. Cut them into any shape you desire and then seal with beeswax.

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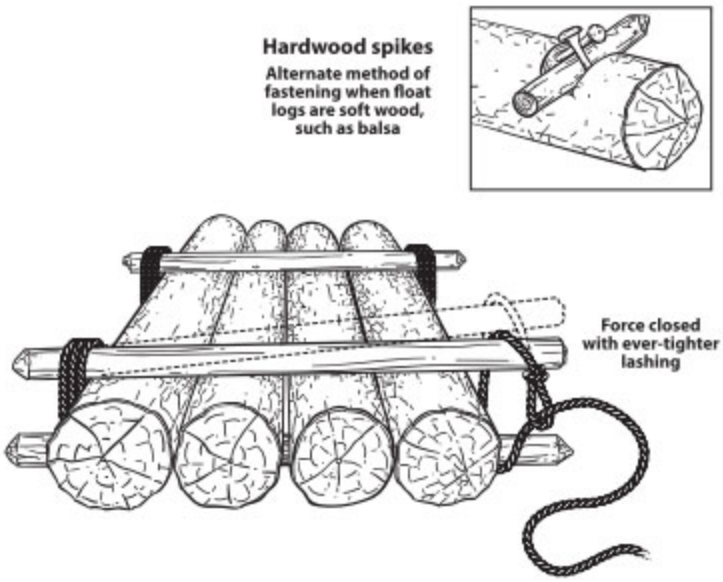
BOATS

Here are a few different kinds of watercraft that can transport you and your kit if necessary.

RAFTS

A raft is a simple conveyance that can be used to transport you and or your gear over distance in water. Logs work best for this, but since they are round you need to secure at least two together as a stable platform to keep them from rolling in the water. In an emergency, lash (using shear lashings with clover hitches) two or three logs at the end that you plan to straddle while floating down the creek or river. Be very careful about the dangers that lie underneath you as you go—not just animals but snags and rocks that might catch your clothing or legs and pull you from the raft in a current. If you have time to build a more secure raft, lash your logs on both ends. Try to always sit completely out of the water on the raft, even on a hot day. Make sure the raft is wide enough for you to do this. If the amount of cordage you have available is an issue, try using thinner cross members on the ends of the raft and lash those together to lock the logs in place. A third option is to make a catamaran of sorts with a single log in the middle and smaller logs lashed to either side on cross members. Navigate this vessel by pointing the nose of the middle log and using a pole or paddle to guide it down the waterway.


Hardwood spikes
Alternate method of fastening when float logs are soft wood, such as balsa
Force closed with ever-tighter lashing

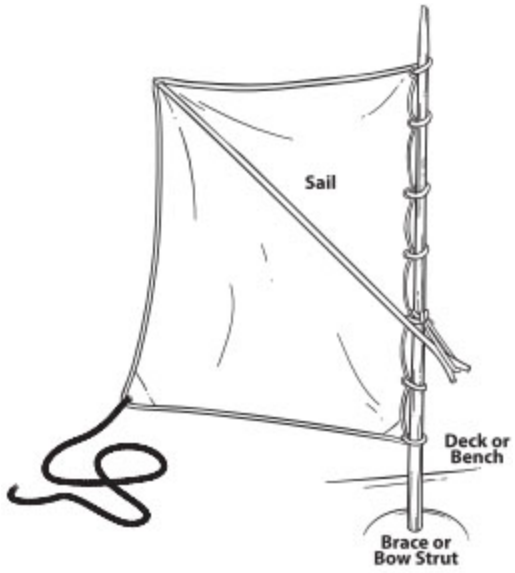
Raft construction

DECK RAFT

You can build a deck raft by attaching several logs together to make a larger deck. You can hold this deck together in a variety of ways, depending on the resources you already have on hand. **Log dogs** are metal implements that can be removed when you're done with the raft and taken back to camp for another use. In the old days, these U-shaped brackets would be hammered into two logs that were side by side and then staggered to create a larger raft deck. Nails driven into the cross members on the deck raft make a more permanent setup. You can also lash together the logs and recover the cordage at the end of the trip. Deck-style rafts afford the opportunity to build a steering rudder on the back that is built into a raised bracket. These deck rafts can also be large enough to hold a shelter tent for sleeping. They can also easily be fitted with a seat for long journeys.

SAILING A RAFT

When we talked about building a long-term kit (see Chapter 1), I mentioned the versatility of an **oilcloth tarp**. This material is lightweight enough that it can be used as a sail for your raft. When you are assembling your raft, notch the center log at about 8"–10" into the deck so that a mast can fit into it. Use a green sapling that is about 3" in diameter, and shave the end a little bit so that it screws firmly into this hole. Using the existing tie-outs you have on a Tentsmiths-style tarp, you can lace the tarp up one side to the mast pole. Use a diagonal bracing pole of about 1½" diameter from the mast about two tie-outs from the bottom to the upper corner on the outside of the sail, and then use another piece of rope on the near corner to control the sail into and away from the wind. You can fasten the mast with a loop of rope, but make sure it isn't tied too tight. You want the mast to swing so that the sail can adjust with the wind.



Attaching a sail

RUDDERS

A rudder allows you to steer the boat left or right while traveling. Rudders are essentially long oars that are attached to the back of the raft and sit in the water. You will need a stationary object or bracket to hold the rudder in place for steering. You will also need a fulcrum for the rudder. Both of these can easily be fashioned with a Y branch placed into a hole similar to the mast hole at the rear of the craft.

ANCHORS

Sometimes you may need to anchor your boat if you plan to fish or rest. Making an anchor is incredibly simple, and the materials you choose are at your discretion. A simple bag of rocks on a line attached to the raft will do just fine. You can even improvise something out of railway plates.

PADDLES/OAR

The terms *paddle* and *oar* are often confused, but there is a major difference between the two. Oars generally come in pairs and tend to be longer and thinner and are affixed with an anchoring bracket that can be pinned to a rowing craft. Paddles can be either single- or double-sided and can come in any shape. Paddles are used freehanded to move a craft forward. The type of material from which either paddles or oars are constructed can make a tremendous difference in the ease with which you can maneuver the craft.

BUSHCRAFT TIP

Paddles make it much easier to maneuver a boat, which makes them highly prized watercraft accessories. In fact, handmade Native American paddles were sometimes very ornately decorated and carved works of art. Understanding how to

properly carve a wooden paddle is a good skill to own. Hardwoods are preferable for this task.

Use pieces that are at least 6" wide so that they operate as a serviceable paddle. The length is up to you, but start with something that is as long as the distance from your chin to the ground. From there, shorter lengths with wider blades work well as sculling paddles, for example.

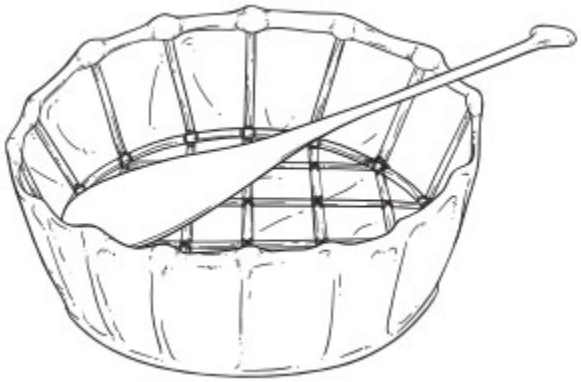
BULL BOATS

Some Native American tribes used **bull boats** to move skins, supplies, and firewood from upriver areas back to camp. These boats were lightweight so that they could easily be carried overland and stored until needed. Since the bull boat is round, most navigation is achieved by sculling the paddle. The earliest bull boats were made with a wood frame and covered with a skinned green buffalo hide with the hair on the water side. Once the skin dried into rawhide, it formed a hard outer shell that was waterproof and durable. Many times the tail was left on the hide and used as a tug strap.

These days, making a bull boat can still be accomplished using a tarp or a heavy piece of canvas as a skin. Note that plastic or poly tarps are not a great idea for these crafts because they are likely to tear easily if they get snagged on anything in shallow water.

To build a bull boat, collect several flexible saplings about 1½"–2" in diameter for the frame. First create the hoop size that you want for the finished craft. Eventually this will be the top or the gunnels of the boat. Lay this hoop on the ground and then lash a sapling bent from end to end across the center. Bend four more samplings and lash them at half the distance in both directions. You now have a solid frame that can be “skinned” to create

your boat. To add the skin, it is best to turn the frame upright on top of the tarp that you plan to use, drawing all the excess material inside the frame. If you do not have tie-outs on the tarp, use toggles or small stones to secure it tightly inside the frame. To add buoyancy you can make a wreath or flotation circle around the outside of the boat. To construct this wreath, place stakes into the ground and lay bows onto the staked frame, lashing them around the perimeter of the boat. Then finish the frame in the same manner as before and skin it the same way. The advantage to this kind of boat is in the way it floats.



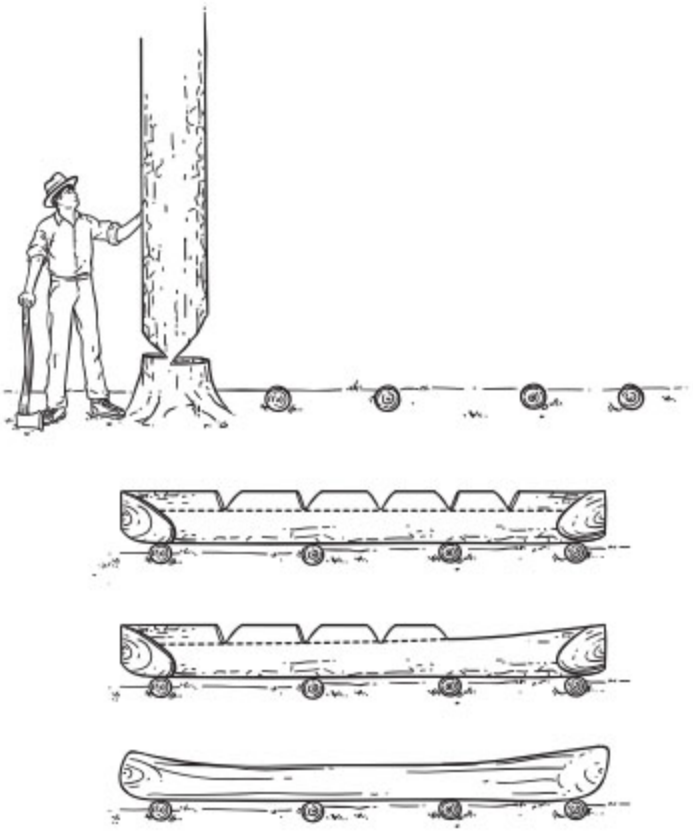
Bull boat

DUGOUTS

Dugouts, essentially canoe-type boats, are among the most resilient of watercrafts. That said, they are also very labor-intensive. You will need a proper tree of lighter wood such as poplar. Poplar wood will be easier to carve or burn out—whichever method you elect to use. Daniel Boone’s dugout was made from the yellow or tulip poplar tree. This project requires a good axe and a few other carving tools. Select a log that is at least one-and-a-half times wider than you and about 8'–12' in length. The size really depends on the kind of time you have and the equipment you are carrying.

Once the log is prepared, carve the ends into a wedge shape that will help the vessel cut through water. Then you will remove the bark from the log—a task that is much easier in spring than in winter. Now it is time to hew the log for further processing. Set up a hewing line on the log that is about two-thirds of the way up from the bottom of the log. You can make a simple chalk line by simply rubbing a string with charcoal and popping a cordage down at both sides to create a visible line that will guide you as you cut.

Make a series of V notches down the top of the log about 3' apart and cut down to the line. Turn the log on its side and remove the areas between the V cuts with your axe. This process is called hewing the log and is identical to the process used to make dimensional timber from a round log. Once you have a flat surface, roll the log again to the top and decide what method you will use to make the center cavity where you will sit. Make your decision to burn or carve based on the available tools. If you have an adze tool for digging out the space, use it in conjunction with an axe. Or you can burn down the cavity as you would to make a bowl: burn and scrape, burn and scrape, until you reach the desired depth and width of the cavity. The advantage to digging is that the log will dry more slowly, which makes it less likely to crack.



Dugout boat

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PACK FRAMES

A pack frame, while not a container or conveyance, allows you to comfortably carry items over distance. Pack frames come in many configurations, from a simple triangle of three sticks to bent-wood hoop frames and pack boards. The ability to remove the pack from the frame and use it for carrying things such as firewood or game is what makes frames invaluable for long-term excursions. You can easily improvise straps for your frame from rope, webbing, or mule tape.

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TIPS AND TRICKS

1. When building watercraft, remember that any vessel will need to displace more water by volume than the weight it is intended to carry.
2. Remember, a smaller craft like a bull boat can be made to tow part of your gear if necessary, but *never* put all your eggs in one basket. Carry equipment on a smaller boat that you can tow in case the boat you are riding in tips or flips.
3. Make sure to build your watercraft close to water so that you do not have that far to carry it when it is complete.
4. If burning the cavity for a dugout, cake some mud on the edges near your workspace because this will act as a fire retardant.
5. When conveyance is not possible, you may be surprised at how little weight you can comfortably carry over distance. For the average person, 30 pounds should be your limit. If you can make more than one trip to your camp location with supplies, then each load is lighter and you will be able to bring more equipment.

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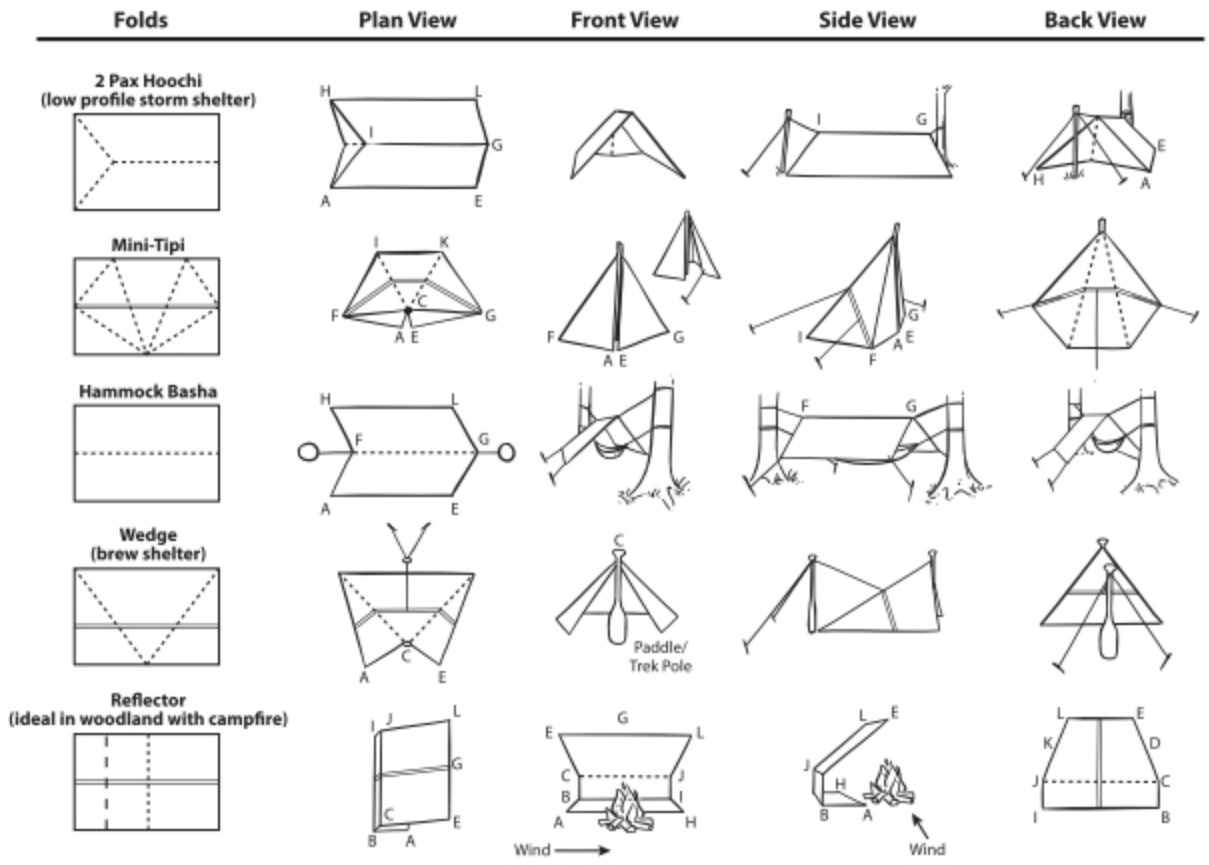
Appendix A
TARP SETUPS

Following is a quick reference of basic tarp setups to assist you with your camp configuration. This form of temporary shelter, if properly constructed, will keep you safe from wind and precipitation. You can then set up a bed of your choosing to combat ground convection.



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Appendix B
DUTCH-OVEN COOKING

Cast-iron cookware has been a staple of camps since the first North American settlers arrived. The Dutch oven is about the most versatile cooking implement in your long-term kit. In the Dutch oven you can boil, fry, bake, and braise. You can put it right on the fire coals and even flip the lid upside down to use as a skillet for making pancakes!

CARING FOR YOUR DUTCH OVEN

A well-maintained Dutch oven will last you forever. Remember that you should never use soap to clean cast-iron cookery. Clean it gently with running water and wipe out any grease and food bits with a cloth. If it is really well seasoned, you may not even need water to clean it and can just wipe it out after use. Before you even use your Dutch oven, make sure you have seasoned it properly according to the manufacturer's instructions.

SEASONING YOUR DUTCH OVEN

Oftentimes, a Dutch oven will arrive coated in a wax that prevents it from cracking when it is stored and shipped from the manufacturer. To get rid of this wax, place your Dutch oven upside down in a conventional oven that has been heated to 350°F. Do the same with the lid. You might want to put a cookie sheet lined with tin foil under the Dutch oven while you are baking off the wax just in case any residue drops. There tends to be a lot of

smoking during this process—do not be alarmed! Once the smoking stops, the Dutch oven is ready to be seasoned. Wash it out with soap and water (this is the only time you will let soap touch it) as soon as it is cool enough to handle.

Seasoning the Dutch oven seals it so that it does not rust and ensures that your food does not take on a metallic taste. Preheat the oven to 425°F. Wipe the Dutch oven down with a rag soaked with some kind of cooking oil such as olive, canola, or vegetable shortening. Make sure you wipe the inside and outside, top and bottom, and do the same for the lid. Bake them in the oven for an hour or so until the smoking has stopped. Repeat this process three times. When you are finished, make sure you give it a once-over to check for any spots that you missed. Every inch of the Dutch oven and its lid should have a glossy finish.

SQUIRREL STEW

6 servings

⅛ pound slab bacon, cubed
1 teaspoon salt
¼ teaspoon pepper
2 tablespoons flour
2 squirrels, cleaned, cut into 6 pieces each
2 large onions, thinly sliced
2 cups beef or chicken stock
Leafy tops of 2 stalks of celery
1 can beans of your choice
2 large ripe tomatoes, peeled
1 cup fresh corn kernels

1 teaspoon Worcestershire sauce

1. Fry bacon in the bottom of your pot until browned, reserving the fat. Set aside.
2. In a medium bowl or on a plate, mix salt and pepper in with the flour. Dredge squirrel in seasoned flour and sauté in the bacon fat until it is brown on all sides.
3. Add onions and cook until soft. Add broth and celery tops. Cover and bake at 350°F for 1 hour.
4. Remove celery tops and add the beans, tomatoes, corn, and Worcestershire sauce. Cover and bake until vegetables are tender—about 30 minutes. Skim off excess fat and thicken gravy with additional flour and ½ cup cold water. Serve hot topped with the bacon.

COWBOY SOUP

6–8 servings

2 tablespoons olive oil
1 pound ground beef
1 medium onion, diced
1 russet potato, diced
1 can peas
1 can green beans
1 can corn
1 can diced tomatoes
1 can baked beans
1 medium onion, diced

Chili powder
Bay leaf
Nutmeg
Salt
Pepper

1. Add the oil to the bottom of your pot. Brown ground beef and onion together. Add remaining ingredients except seasonings. Do not drain vegetables.
2. Put on a low boil until potatoes are fork tender, about 20 minutes. Add seasonings and simmer for another 30 minutes.

POTATOES AND BROTH

6–8 servings

2 cups water
4 cups beef broth
2 pounds new potatoes, peeled and diced

1. Heat water and beef broth to boiling.
2. Place potatoes in the pot and simmer for about 15 minutes or until the potatoes are fork tender. Serve as a soup in the pot.

CORNMEAL BATTER CAKES

About 2 dozen 3" cakes

1 cup yellow cornmeal
½ teaspoon baking soda
½ teaspoon salt

2 large eggs, lightly beaten
1¼ cups buttermilk
2 tablespoons shortening, melted

1. Whisk cornmeal, baking soda, and salt together in a small bowl; set aside.
2. Combine eggs and buttermilk in a separate bowl and then stir into the dry mixture. Stir in melted shortening.
3. For each batter cake, pour about 2 tablespoons batter onto a hot, lightly greased, inverted Dutch-oven lid. Turn when the tops are covered with bubbles and the edges are browned.
4. Serve with syrup, if desired.

FRY BREAD

8 servings

Shortening for frying
2 cups all-purpose flour
½ cup nonfat dry milk
1 tablespoon baking powder
¾ teaspoon salt
¾ cup lukewarm water
Cinnamon
Sugar

1. Melt shortening in Dutch oven for a depth of about 2".
2. Stir flour, dry milk, baking powder, salt, and water together. Knead on floured board. Cover and let stand for 15 minutes.
3. Cut dough into 8 sections, then flatten or roll out to 2" thick.

4. Drop pieces of dough into the hot oil to fry about 2 minutes or until done. Dredge in cinnamon and sugar.

QUICK AND EASY BREAKFAST CASSEROLE

8–10 servings

8 slices bread
2 pounds sausage, browned
16 ounces grated Cheddar cheese
12 large eggs
1 quart milk
1½ teaspoons dry mustard
1 teaspoon salt

1. Line a 12" Dutch oven with tin foil. Lightly grease the foil with butter or oil.
2. Break up the slices of bread into ½" pieces and place them in the Dutch oven.
3. Crumble the cooked sausage meat over bread and cover with cheese.
4. In a separate bowl, mix eggs, milk, dry mustard, and 1 teaspoon salt. Pour the egg mixture over the layered sausage and bread.
5. Cover and bake for 35–40 minutes at 350°F, checking occasionally.

CHICKEN IN A POT

6–8 servings

1 (3–4) pound whole frying chicken
½ teaspoon salt

¼ teaspoon pepper
1 teaspoon poultry seasoning
¼ teaspoon dried basil

1. Wash chicken and pat dry. Sprinkle cavity with salt, pepper, and poultry seasoning. Place in Dutch oven and sprinkle with basil.
2. Cover and bake 4–6 hours at 275°F or until tender.

EASY CHICKEN DINNER ON THE CAMPFIRE

6–8 servings

3 large carrots, peeled and diced
1 head of broccoli, separated into florets, stalks discarded
2 russet potatoes, peeled and diced into ½" pieces
1 whole chicken
1 cup flour
1 tablespoon seasonings of your choice
Oil for frying

1. Cut chicken into 8 parts. Skin chicken.
2. Mix flour and seasonings in plastic bag. Place 2 chicken parts at a time in bag and shake. Remove chicken from bag when coated and repeat until all chicken is coated. Place potatoes in bag and shake. Remove potatoes from bag.
3. Put about ½" of oil in Dutch oven and place on coals. When oil is hot, add chicken and brown on all sides. Pour the rendered fat off the chicken.
4. Add approximately ¼" of warm water. Place potatoes and vegetables over chicken. Cover pot and place back on the coals.

5. Cook for about 1 hour. You will know it is done when the vegetables are tender and the juices run clear when you prick the chicken.

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Appendix C
CLOUD CHARTS

Reading clouds can help you predict weather systems. Here is a short primer on cloud types.

Altocumulus: These large, gray puffs usually indicate an afternoon thunderstorm is coming. Usually seen in the middle altitude in humid weather.

Altostratus: These gray/bluish clouds cover the entire sky and appear before a weather front in the middle altitude. You really can't see a lot of sun with these clouds—maybe just a little where the clouds are very thin. These clouds usually indicate that widespread, continuous precipitation is coming.

Cirrocumulus: These clouds have a patchy or puffy white appearance. They are ice clouds that appear in the high altitude. They indicate that precipitation is coming within twenty-four hours.

Cirrostratus: These clouds are very thin and look like a halo around the sun or the moon. They are high-altitude clouds full of ice crystals. They indicate rain or snow will arrive in the next twenty-four hours.

Cirrus: These are thin, wispy clouds that appear in the high altitude. They look a little bit like hair. They travel from west to east and indicate that fair weather is coming.

Cumulonimbus: Appearing like giant pieces of cauliflower in the sky, these clouds can produce lightening, thunder, hail, and heavy rain. They can

sometimes even form tornadoes.

Cumulus: With their puffy tops and flat bottoms, they indicate fair weather. They appear in the low altitude.

Mammatus: These form under a thunderstorm and look a little like pouches. They are evidence that a storm is weakening.

Stratocumulus: Gray or whitish in color, these clouds have round bases and appear in the low altitude. They hardly ever drop any precipitation.

Stratus: Of all the clouds, these hang the lowest. They are gray and cover the entire sky. They look a bit like fog and sometimes are accompanied by a light drizzle, but they tend not to drop precipitation.

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Appendix D
PRIMITIVE NAVIGATION

When in the wilderness, you might find yourself in a situation that requires you to change positions or search out a new area. If you do not have access to a reliable compass, you may need to rely on primitive navigation to find your direction.

There are a few things to remember in navigation:

1. Your shadow can tell you a lot about the direction of the sun.
2. In the Northern Hemisphere, the sun rises in the east and sets in the west.
3. The sun travels a southern arc across the sky, marking the passage of time during the day.

You can put all this together and deduce that when you wake up, the morning sun will be southeast. When you go to bed, the sun will be southwest. During the day, if your back is to the sun, you are facing north. If you are looking at the sun, you are looking in a southerly direction. I say "southerly" because most methods of primitive navigation will point you the correct way but will not give the point of cardinal direction accurately.

RULE OF EQUAL ALTITUDES

To get a correct east-to-west line using shadows, you first need to understand the rule of equal altitudes: *Twice a day—once in the morning*

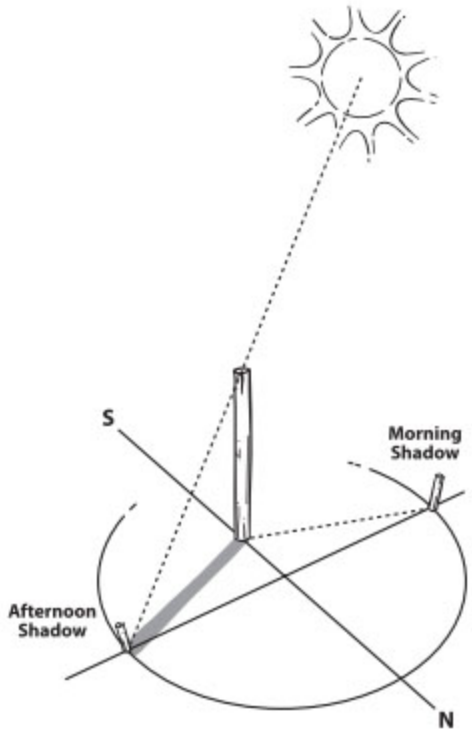
and once in the afternoon—the sun will be at the same altitude in its arc across the sky. Only at these two times will any shadow from a measurement object, like a stick, be the same length. This means that at only two times during the day this measurement object will run perpendicular to a north-to-south line in order to provide a true east-to-west line. You'll need to use any shadow stick for several hours both before and after noon when the sun sets on its southern path.

THE SHADOW STICK METHOD

For ages, the shadow stick method has been the hallmark of primitive navigation. Travelers have used it to first find an east-to-west line and subsequently a north-to-south line. It has been my experience, however, that this method can be highly inaccurate because so many people do not understand the basic rules.

Selecting a Shadow Stick

Select a shadow stick that is at least 2' long. You want something that you can drive into the ground in a flat, unobstructed area so it casts a shadow. Then you can track the shadow's movement while the sun continues on its arc. In the morning, place the stick in the ground and then mark the end of the shadow with a peg or stake. This shadow, in the morning, will be in a westerly direction. Wait at least a couple hours past noon and place another peg in the ground at the end of the shadow. Do this about every hour. After placing the final peg in the ground, lay a stick or a piece of cordage across the two most outside pegs. That is your east-to-west line.



Shadow stick method

TRAVELING SHADOW COMPASS METHOD (PATHFINDER SUN COMPASS)

For a traveling shadow compass, you will select a smaller piece of wood, at least 5" × 7", that will act as a miniature traveling shadow stick. Place this board lengthwise to the east–west line you have made by the shadow stick method. Drill a hole into the center of the board, and place a small stick in the hole. This stick will cast a shadow on the board. Track the movement of the sun about every hour. As a reference, the sun moves about 15° per hour. This time, mark the end of the shadow right on the board. You can use a round pot or something similar to make the mark almost like you would with a protractor. Then divide these lines into 15° increments starting with the center and then two 45° points for northwest and northeast. Mark everything right on the board. The 90° mark will be on the back of the

board. Place a dot on the board every hour through a full day of sun, and then, at the end of the day, connect the dots to form a curved scale. Now you have created your own sundial.

Once all your markings are complete, drill 4 small holes in the corners of the board so that it can be held above ground and kept level. Whenever you need to find a direction or estimate the time, simply hold the board with the back toward the sun and rotate it until the shadow touches the curved line. Set your sundial compass on the ground and this will give you the cardinal directions again from your standing position. Note that this sundial will only be accurate for about 30 days before the shadow length starts to change along with the seasons.

NIGHTTIME NAVIGATION

There are many methods of using the stars and constellations to find direction, but they can all get a little complicated. A good friend of mine, John McCann of Survival Resources, taught me a method called Left, Up, Right, Down (LURD). This allows you to pick any star (except the North Star because it is too high in the sky) and does not rely on any particular star group. Look for a star—not a planet—that is above the horizon but not too high in the sky. As the earth moves, the locations of the stars change, and this movement is the principle behind the LURD method. Find a forked stick that is about 3' in length and a nice, flat place where you can lie down for about 30 minutes. While you lie on the ground, place the stick in the air with the Y facing upwards and use that Y as a viewfinder. Now locate a star in this Y of your stick. Get comfortable and relaxed but make sure you do not move the stick. After about 30 minutes the star will have moved. Here is where the acronym LURD comes in: If the star has moved to the left, you are facing north. If it has moved left and up, you are facing northeast. If it has moved right and down, you are facing southeast. Basically left, up,

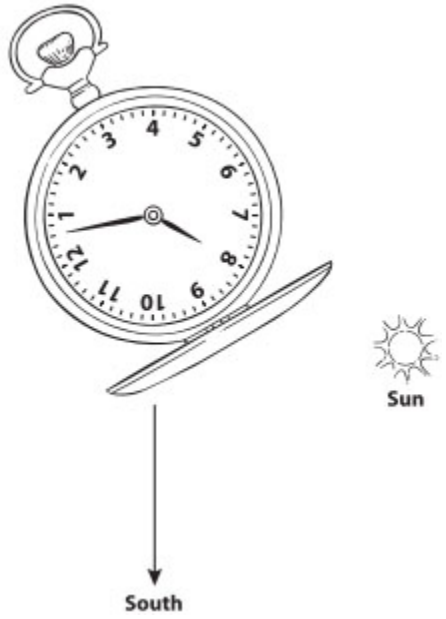
right, down correspond with the cardinal directions of north, east, south, west.

THE MOON METHOD

You can use the phases of the moon, outside of the new and full moon, to determine direction pretty easily too. Observe any crescent moon and trace a line from tip to tip and then to the horizon. That will give you a southerly direction.

BUSHCRAFT TIP

1. Use a string to verify that the two most outside pegs from the shadow stick are an equal distance from the stick for the best accuracy.
2. Solar navigation follows Local Apparent Time, not Standard Time, and may not match your watch if you have one.
3. Your watch can be a direction finder even if it has no hands. If you have a watch, point the hour hand toward the sun and halfway between the hour hand and 12 will be southerly. If you have a digital watch, just draw a watch face with hands on paper to match the one on your wrist.
4. Moss does not always grow on the north side of the tree, but the heaviest vegetation will always point southerly to take advantage of photosynthesis.
5. If you cut down a tree, the growth rings can help with direction finding; the tighter rings will be wider on the southern side.

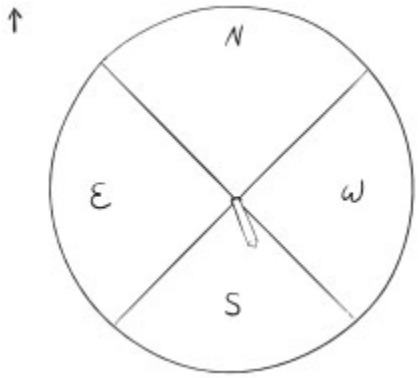


Using your watch as a compass

MAKING A SIMPLE SHADOW BOARD

Deducing general direction from shadows is pretty reliable, but it can be confusing if you have not had a lot of practice. If the sun is sparse or you are on the move, it is often hard to keep track of the shadows. You can make a simple shadow board to help guide you in these situations. All you need is a flat surface, such as a wood plank, with small ridges. Make a circle on the board by tracing a cup or a pot and using an X to divide it into four separate quadrants. Write letters in each of the quadrants in clockwise order: NWSE. This will look a different than a normal compass, but remember that we are dealing with shadow and sun travel. Make a hole in the center of the board and place a stick that will cast a shadow within the circle. Now you can simply hold the board in front of you and turn, directing the shadow to match the quadrant you wish to travel. The front of the board that you have labeled as the northern quadrant will, in turn, be in that general direction. For greater precision, pay attention to the time of day.

If the sun is low from morning or evening, you will want to place the shadow more easterly or westerly in the quadrants for greater accuracy.



Shadow board quadrants

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Appendix E
MINERAL

HARDNESS SCALE

MINERAL	MOHS RELATIVE HARDNESS SCALE	SCRATCH TEST	OTHER FACTS
Talc	1	Scrapeable with fingernail	Used in talcum powder
Gypsum	2	Scrapeable with fingernail	Ingredient of plaster
Calcite	3	Scratch with copper coin	Used in cement
Fluorite	4	Scratch with a nail	Used in toothpaste
Apatite	5	Scratch with a nail	Mineral in bone
Feldspar	6	Scratch with steel file	Ingredient in glass, etc.
Quartz	7	Scratches win-dow glass	Used in glass, etc.
Topaz	8	Scratches glass	Gemstone
Corundum	9	Scratches topaz	Rubies and sapphires
Diamond	10	Scratches corundum	“A girl’s best friend”

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Appendix F
MEASUREMENT CONVERSIONS

Here are some simple conversions for the most commonly used units of measure.

CUSTOMARY UNITS	METRIC UNITS
1 inch	2.54 centimeters
1 foot	30.48 centimeters or 0.3048 meter
1 yard	0.914 meter
1 mile	1.609 kilometers
1 ounce	28.35 grams
1 pound	454 grams or 0.454 kilogram
1 fluid ounce	29.574 milliliters
1 quart	0.946 liter
1 gallon	3.785 liters

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ACKNOWLEDGMENTS

At the end of the day we must realize where the knowledge we have gained even comes from to begin with. For me this is a complicated question indeed. As I began this journey, I was not at all accomplished in the aspects of social media, didn't even know what YouTube was, and—as I have learned—there was not much information about bushcraft in that media stream. So, for me, the learning came from two sources: research and practical exercise.

Reading has always been my favorite form of research, and there are mountains of books on every facet of the skills needed for self-reliance if you are willing to search them out. Authors such as Hyatt Verrill, Warren Hastings Miller, Francis Buzzacott, and, of course, George Washington Sears and Horace Kephart have published much on this topic. In the modern day we have many authors who can help us gain knowledge in this area as well, and some of them, like Bradford Angier and Mors Kochanski, are now considered standards. We have access to the Internet, which has opened many doors that were never available thirty years ago. To such great thinkers as Vint Cerf, who enabled us to pass information across the boundaries of the seas in instant fashion, we owe a great deal.

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Tables

BTUS FOR WOOD BURNING

SPECIES	HEAT PER CORD (MILLION BTUS)	% OF GREEN ASH	EASE OF SPLITTING	SMOKE	SPARKS	COALS	FRAGRANCE	OVERALL QUALITY
Black locust	27.9	140	Difficult	Low	Few	Excellent	Slight	Excellent
Black walnut	22.2	111	Easy	Low	Few	Good	Good	Excellent
Bur oak	26.2	131	Easy	Low	Few	Excellent	Good	Excellent
Eastern red cedar	18.2	91	Medium	Medium	Many	Poor	Excellent	Fair
Honey locust	26.7	133	Easy	Low	Few	Excellent	Slight	Excellent
Larch (tamarack)	21.8		Easy-med		Many	Fair	Slight	Fair
Lodgepole pine	21.1		Easy		Many	Fair	Good	Fair
Maple (other)	25.5	128	Easy	Low	Few	Excellent	Good	Excellent
Mulberry	25.8	129	Easy	Medium	Many	Excellent	Good	Excellent
Osage orange	32.9	165	Easy	Low	Many	Excellent	Excellent	Excellent
Ponderosa pine	16.2	81	Easy	Medium	Many	Fair	Good	Fair
Red oak	24.6	123	Medium	Low	Few	Excellent	Good	Excellent
Rocky Mountain juniper	21.8	109	Medium	Medium	Many	Poor	Excellent	Fair
Silver maple	19.0	95	Medium	Low	Few	Excellent	Good	Excellent
Spruce	15.5	78	Easy	Medium	Many	Poor	Slight	Fair
Sycamore	19.5	98	Difficult	Medium	Few	Good	Slight	Good
White oak	29.1	146	Medium	Low	Few	Excellent	Good	Excellent
Willow	17.6	88	Easy	Low	Few	Poor	Slight	Poor

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MINERAL	MOHS RELATIVE HARDNESS SCALE	SCRATCH TEST	OTHER FACTS
Talc	1	Scrapeable with fingernail	Used in talcum powder
Gypsum	2	Scrapeable with fingernail	Ingredient of plaster
Calcite	3	Scratch with copper coin	Used in cement
Fluorite	4	Scratch with a nail	Used in toothpaste
Apatite	5	Scratch with a nail	Mineral in bone
Feldspar	6	Scratch with steel file	Ingredient in glass, etc.
Quartz	7	Scratches window glass	Used in glass, etc.
Topaz	8	Scratches glass	Gemstone
Corundum	9	Scratches topaz	Rubies and sapphires
Diamond	10	Scratches corundum	“A girl’s best friend”

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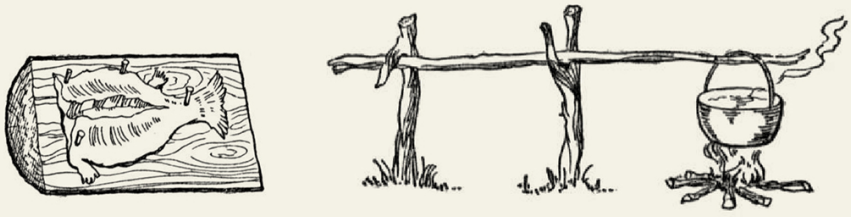
The BUSHCRAFT FIELD GUIDE TO TRAPPING, GATHERING, & COOKING IN THE WILD



DAVE CANTERBURY

New York Times Bestselling Author of *Bushcraft 101*

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The Bushcraft Field Guide to Trapping, Gathering, and Cooking in the Wild

Dave Canterbury, *New York Times* Bestselling Author of *Bushcraft 101*

Avon, Massachusetts

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I would like to dedicate this book to my loving granddaughter Layla. In the many books, articles, and other forms of media I generate, I wish that she will be able to see me and read my words many years from now and that her children may know who their grandfather was, and that he enjoyed passing on the knowledge of his forefathers so that she may pass on this knowledge to future generations through my written words. I think that leaving a legacy for others to enjoy is a true blessing and gift from God, and this gift I dedicate to her.

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Acknowledgments

When you begin to research for a book or you begin to study a subject in depth you inevitably look for sources of information you can trust to learn from, then you go out and you practice what you have read or seen, and you quickly get a feel for what actually works for you. In cooking, everyone has a different taste for what they like and you adapt to make the foods taste good to you.

So when I began to look through source materials I found myself going right back to some of the great authors I had learned from in the past as they had already adapted many methods of cooking to the wilderness. The great thing about the outdoors is eating in it! Nothing tastes quite as good as it does when cooked over an open fire.

To that end authors like Horace Kephart, George Washington Sears, Hyatt Verrill, Steven Watts, David Wescott, Ellsworth Jaeger, Bernard Mason, Warren Miller, and many others already have valuable information on what apparatus to use for cooking this or that, and how to adapt that kitchen recipe to the field. All one has to do is practice it and adapt it to his personal gear selection and taste for foods. So to that end I have compiled this book on camp cooking according to my style of woodland cooking. I thank all of the above authors and many others for their tireless efforts to educate us all in the skills that have somewhat become lost in modern times. And with this book I hope to rekindle that love of cooking in the great outdoors.

I would last but not least say that truly God is the provider and we benefit from the vast amount of resources he has provided. It is our

responsibility to understand how to utilize them so that we can become more self-reliant.

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Introduction

This book will be useful to anyone who recreates outdoors whether it be for a day hike, a trail hike, a weekend camp, or a longer-term hunting trek. It is written with the ultimate goal of understanding the difference between wants and needs when it comes to foods and their preparations.

When we think about bushcraft, especially when we introduce survival mentality into the equation, we often think of living completely off the land and meeting all of our food intake needs from the resources around us within the landscape. However, the fact is we will spend much more time in nature on a recreational basis than in a true survival situation.

At the same time we cannot go on a weeklong hunting camp and expect to live completely from what we can provide by rod and gun or even necessarily from traps and foraging. Seasonality plays a large role in foraging. Weather can affect game movements, and we are at the mercy of the season for legal take. Size limits restrict fishing . . . the list goes on. So we cannot expect in the modern day to just wander off with a few friends and live completely off the land even for a week in most areas and in most seasons.

To that end many books have been written over the years that speak to what implements and foods we can take with us and how best to store and use it, what implements we will need for food preparation, and what different food offerings can be made from just a few simple sundries.

Sometimes we can take more extravagant amounts of cooking kit and foodstuffs with us depending on our form of conveyance, and other times we are limited to what we can personally carry. Understanding this and

adapting can make life on the trail very comfortable and allow us to "smooth it" as the sportswriter and conservationist Nessmuk would say.

This book is an attempt to capture the gear, methods, and types of sundries we have available to us now to get food from our surroundings. While I'll include traditional foods and methods of gathering, catching, and preparing food, I'll also give attention to what we have available now that may not have been attainable for those writing in the past.

It is no secret that there is romance in living as close to nature as possible. Roasting a nice piece of fresh game meat over the fire on a forked stick, while a small ash cake is cooking within the coals, and a nice cup of hot coffee poured from the kettle sets the tone for an evening of true woodsmanship under the stars. We should take advantage of this at every opportunity, but we should also be prepared to use what we can pack to supplement that food if things don't work out as we had hoped.

While we can fashion cooking implements from natural materials to help us cut weight from packing them in, we should also realize many items available in the modern day make cooking very convenient. New materials like titanium weigh less for an entire cook kit than a single pan carried in the 1920s and 1930s. We must understand what types of materials suit our needs best and know the pros and cons of these materials, as well as what implements we can fashion from the woods to aid us in cooking, especially if we are packing in by foot and cannot afford the weight of heavy fire irons and such.

In the same respect if we are to be well-rounded and educated woodsmen, we must also be able to create many items needed for preparing our food off the landscape. This knowledge will make an emergency situation a bit less hectic. Were we to lose our kit from, say, a canoe rolling with our pack in it, washing our beloved cook set down river, we still need

to make it back to our home and family, and we may need to walk a day or more to get there. We will need to know how to acquire food, disinfect water, and possibly cook without many tools on hand.

Even if we don't have an emergency, being able to hunt, trap, fish, and forage allows us to supplement the foodstuffs we have, making more variety in our meals as well as extending our provisions. Understanding the nutritional value of plants and animals and knowing how to cook them will make us not only more at home in the natural world but more self-reliant and allow us to rely less on carried items and foodstuffs in the long run.

In survival, food is nowhere near the top of the list of priorities to stay alive especially in the short term. But I will say that variety within the diet and good food makes a lot of misfortune much easier to swallow.

Within this book we will explore everything from what types of foods we should carry for a balanced diet on the trail to what we can forage from the natural world to supplement that food, as well as what implements we should carry depending on our aim, and what we can manufacture even as it may pertain to an emergency.

We will look at how to best save room within our outfit by carrying easy-to-prepare foods as well as how to process wild foods we have harvested from the landscape. We will talk about gathering meat sources from a perspective of additional foods but these methods could also apply in an emergency if we carry the knowledge to manufacture needed items as well.

—Dave Canterbury

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Part 1

Packed-In Food

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Chapter 1

Deciding What to Bring

"Variety is as welcome at the camp board as anywhere else. In fact more so for it is harder to get."

—Horace Kephart

Understanding what to pack should be the first priority when venturing out, just as much as leaving a good game plan with someone close to you in case of an emergency. I tell my students there are really five key items that need to be within any pack at the onset of a trip:

- Cutting tool
- Combustion or fire-making devices
- Cover, including clothing that will protect you from the elements
- Metal container that can be placed into a fire if needed
- Cordage for use in bindings and lashings

These simple items will help protect the most important thing, which is your body's core temperature. Hypothermia (getting too cold) and heat exhaustion (getting too hot) are the main killers in outdoor emergencies. These five items are all used to manipulate the surroundings to control the body's core temperature.

These five items are also the most difficult to reproduce from the landscape, requiring specific materials, skill sets, and sometimes great amounts of time.

Milk Weed (lookalike—avoid)

Cutting Tool

The knife must be capable of many things, from cutting small limbs from trees to butchering game. You should always have a backup, like a pocket knife, as well. But your primary blade should be a sheath knife that you keep on your hip. Secure it well so it will never be lost. It should have a 5" blade in case it is needed when other tools are not present to process fire materials, be a full tang (one solid piece with the handle attached) so that it is strong enough to stand abuse, have a sharp 90° edge on the spine to aid in tinder processing or scraping a ferrocerium rod, and be made of high-carbon steel for use as a last-emergency fire resource for flint-and-steel ignition.

Combustion and Fire-Making Devices

The combustion device you choose is a matter of personal preference. For me, I want three such devices, all in my pockets with backups in the pack:

1. A Bic lighter is about the most foolproof device ever made for creating flame. If conserved and used properly it will give you fire in almost any weather.
2. A ferrocerium rod (ferro rod), which can be purchased for a few dollars at a sporting goods store, can come in handy and help conserve the lighter if tinder sources are prime or highly combustible.
3. A magnification lens can be used as a renewable resource, especially if used in conjunction with making char (which is always a priority as it helps all three devices last much longer).

Cover

For clothing, pack at least two full sets of socks and undergarments, trousers, and shirts. Carry clothing that is comfortable in all seasons. Do not forget to plan for rain and wet weather. In winter, use a heavy wool layer that will act as insulation. Nothing beats wool in cold-weather climates. If freezing rain and sleet are an issue, combine the wool with an oilcloth raincoat.

Leather boots are an absolute must for long-term wilderness activities. Remember that boots are only as waterproof as they are high. Carrying a second pair of boots will save a lot of trouble on long trips so you can alternate and avoid wearing them out. If carrying a second pair is too cumbersome, bring a pair of moccasins to wear when walking around camp so that you give your boots an occasional rest.

A good hat will protect you from the sun and conserve body heat—most of which is released through the head and the neck. Kerchiefs and scarves have been staples of the woodsman’s kit for hundreds of years and have many versatile uses.

A sturdy pair of leather calfskin gloves will protect the hands from briars, brambles, and blisters when doing normal camp chores. In winter, arctic mittens with wool glove liners are indispensable.

In addition, you’ll need a cover element for normal environmental changes. It should be large enough to cover an area as long as you are tall plus 2' and have good, sturdy tie-out points for suspension if needed. This should be combined with an emergency space blanket (the heavy, reusable kind) and an emergency bivvy (heat-reflecting blanket). These are very lightweight and the size of a softball when compressed.

Small backpacking-style tents provide comfort and security from bugs and other wigglers. The downside is that their construction restricts your view and eliminates the ability to use fire as a heat source. There is always

a tradeoff with any piece of gear. There are a lot of different types of tents on the market, but I would suggest selecting one that is made of the heaviest material you feel comfortable carrying. You will appreciate the durability.

Metal Container

A metal container can be aluminum, stainless, or titanium, but stainless is the strongest and most durable. It should have a nesting cup of the same material that can stand the full flames of a fire.

Cordage

Your cordage should be multiple-ply so that it can be broken down to small enough fibers for sewing if needed, but strong enough to hold a ridge beam as well. A #36 tarred bank line is what I recommend.

Beyond these five essentials, I find five more simple items to be of the most use. These will also make an emergency first-aid kit when combined with the others:

- Large cotton bandanna or cloth at least 36" × 36"
- Roll of duct tape
- Headlamp
- Compass with a mirror and movable bezel ring
- Sail-maker’s needle

This entire kit should weigh less than 10 pounds, and from this we build our basic kit for woods running.

Now to the pack itself. The size of the pack is dictated by what we carry or the conveyance available to us. Assuming you are carrying the

pack at least part of the time, you won't want anything too large, but a pack that's too small won't carry what you need.

A day pack is too small and an expedition pack too big, so stay with something in the 35–70 liter range, depending on your body size. Other factors to consider are the amount of time you are planning to be out. Is it only a night or is it two or three? Some of the added weight can be counteracted by using foodstuffs that can make multiple different foods with a few additions, like instant biscuits or dried beans and rice. You must also consider your own fitness level when carrying any load. The maximum load most find to be comfortable walking over distance is about 30–35 pounds. If you are trekking any more than a day or two you should allow at least 10 pounds of this weight for food, cook gear, and water.

There are hundreds of pack brands on the market to choose from in many styles and colors.

Choose a pack that has been made from a durable material such as heavy nylon or canvas. Either of these makes a good choice in materials as they can take much abuse. A military surplus pack that has good solid buckles and straps is purpose-built to take the rigors of the outdoors and is a good low-cost choice to start with.

Remember that the larger the pack the more we are tempted to pack, and the more pockets and pouches we have the harder it is to find what we need. I like a single-bucket design with maybe one outer pocket or flap pocket myself. A waist belt on a pack as well as a chest strap will make it much more manageable under load over distance for sure and this should be considered if that is the intended use of the pack itself.

If the pack is simply a storage facility to be placed into conveyance I would suggest heavy material and straps so that it is durable enough to

withstand being jostled and thrown in and out of a boat or sled, or on and off horses or ATVs.

Nutritional Needs

When you're choosing what food to pack in on your trip, you'll need to weigh a number of considerations, including how long you'll be gone, how much food you can reasonably expect to gather or catch from the land, and how you'll be carrying your equipment and gear—whether you'll be trekking by foot or using vehicles for transportation.

Our first consideration is nutrition. The body needs certain inputs to operate and function at optimal levels. Among these are protein, carbohydrates, fats, minerals, and vitamins. But the most important is water. Most people need about 4 quarts of water per day. Exercise increases that amount up to and sometimes more than 6 quarts. One of your first decisions is how to make sure you have enough water.

Protein

In the daily diet, proteins are provided through many sources that include lean meat and nuts as well as dairy products. Supplemental protein powders also contain large volumes of proteins and these are generally mixed with water or milk, making them easier for the body to metabolize. Look at any trail energy bar and the main listing on the front of the package will be grams of protein.

Many of the protein powders on the market will last a long time. Some come in large plastic containers that can be used for other things after. Find one that is at least 30 or 40 grams of protein per serving and that mixes well with water. Country Cream is a good brand that actually tastes like milk when mixed with water. This can add daily protein and vitamins when used

as recipe ingredients or just consumed as a liquid. Ovaltine and similar mixes will also increase vitamin and mineral intake.

Energy bars are a good choice as well, but the commercial breakfast bars are more palatable in most cases and full of good nutrition as well.

Carbohydrates and Fats

Carbohydrates and fats will give you needed daily energy for exercise, to fuel your body, and to help generate heat. You can get much of this from simple sugars, found in many candies and sweets, but you also need more complex sugars produced from carbohydrates that come from starchy foods such as potatoes, breads, and pastas. So-called “whole grains” provide your body with necessary nutrients like iron and folic acid, along with fiber, which helps your digestion.

You need both carbohydrates and fats for energy. Your body uses calories from carbohydrates first, but then after about 20 minutes of effort, your body begins burning calories from fat. Fat has other benefits as well: It helps your body process fat-soluble vitamins such as A, D, E, and K; it helps insulate your body; and it produces fatty acids that your body needs for brain development, blood clotting, and other bodily functions.

Vitamins and Minerals

Vitamins are organic compounds that your body needs for normal cell growth and function.

Types of Vitamins

There are two types of vitamins, those that are fat-soluble and those that are water-soluble:

- **Fat-soluble vitamins** are those that bind to fat in the stomach and are then stored in the body for later use. We are less likely to become deficient in these vitamins (A, D, E, and K), but more likely to build up toxic levels of them, usually due to extreme overconsumption or overzealous supplement use. (Or maybe just an unhealthy obsession with kale chips . . .)
- **Water-soluble vitamins** make up the rest of the 13 essential vitamins. They can be absorbed directly by cells. When in excess, these vitamins are flushed out of our system with each bathroom break. The water-soluble vitamins—vitamin C and the B complex vitamins, including biotin, niacin, folic acid, and pantothenic acid—need to be restored more frequently, but the body can tolerate higher doses.

Minerals

Minerals are inorganic substances (meaning they contain no carbon) that your body needs to function, and all hold a place on the good ol' Periodic Table (flashback to sixth-grade chemistry class!). There are two groups of minerals: macrominerals like calcium and sodium, which the body needs in large doses, and trace minerals, like selenium and chromium (only a pinch required).

While very important in the long term, vitamins and minerals are less of a major concern short term. However, while in camp it never hurts to stock up on the immune-boosting qualities of vitamins like vitamin C. Some forms of drink mixes provide a heavy dose of immune system boosters. Certain pine needle teas and other plant teas have very high amounts of this vitamin as well. Depending on your experience level and comfort level in the woods, stress and lack of sleep can play great detriment to the overall immune system and it is much easier to get rundown and sick in these situations.

Pine Needle Tea

Pine needle tea is high in vitamin C. Be careful on species selections as there are pines that are toxic if consumed. For example, you will want to avoid ponderosa pines, Norfolk Island pines (also called Australian pines), and yew trees (the yew is not a pine but is sometimes mistaken for one). Lodgepole and Monterey pines may give you digestive troubles.

To make a simple pine needle tea, bring water to a rolling boil and remove from fire. Add a handful of green needles. Chopped is best to release the volatile oils. Place a lid over the container and let steep about 15 minutes, then strain and consume. There is no set ratio of the number of needles to water. Just experiment to find what suits your taste.

Daily Calories

The amount of calories needed daily to maintain good health and the breakdown of these calories depends on age, weight, and other physical conditions, such as how much you exercise. It is generally based on what's called the BMI, or body mass index. There are online calculators that will give you the breakdown of what your daily caloric intake needs should be and how those calories should be supplied.

However, for this discussion we can look at an average for a healthy active male and see that 2,000–3,000 calories per day is a suggested amount of food intake (for women it is 1,800–2,500 calories). Approximately 45–65

percent of total calories should come from carbohydrates, 20–35 percent from fat, and 10–35 percent from protein.

What these numbers really stand for is what you should strive for on a daily basis to maintain good health. However, when we are camped and relaxing or on a hunting trip these concerns of perfection in portioning don't mean a whole lot. It is better for us to understand that a good variety and a balanced meal will make any trip more enjoyable for all and if the side benefits are great food and enough energy to get our daily activities accomplished, well, then that is what we were after.

See Appendix A for the nutritional values of various game animals and of various nuts.

Water

As stated previously, water is one of the most important daily requirements for good health. From a camp standpoint, water provides needed liquid for coffee, tea, hot chocolate, and mixing with "Just Add Water" (JAW) foods.

The problem is we don't want to carry a lot of it because it's heavy. One gallon of water weighs 8 pounds.

Now, we know that we should always camp near a water source if possible. This is one of the 4 Ws of selecting a good camp location (Wood, Water, Wind, and Widowmakers are discussed in my book *Bushcraft 101*).

Bushcraft Tip

Keep these four elements in mind when making camp:

1. **Water:** Always camp near a water source because traveling a long distance daily for this can become an issue especially if an injury is sustained during the camp or if no large containers are available to hold water.
2. **Wood:** You will want plenty of this precious resource nearby, not only for cooking but for warmth.
3. **Wind:** The wind direction can be important from a smoke standpoint. Smoke from your fire should be blown away from your shelter, not driven toward it. It is always best to set a fire lay with crosswind to help feed the fire. Also, wind direction indicates weather. If you do not want rain blowing in on you with an open shelter you must pay attention when building it.
4. **Widowmakers:** These are dead standing trees in the proximity of your camp and nearby that could fall during a wind or storm, causing equipment damage or personal injury.

However, after selecting the site you must be able to make that groundwater resource potable. Most things you would cook that use water will need that water to be hot anyway so boiling is the easiest and safest method to create potable water in the short term. Filtering that water before boiling will make it even better.

Water disinfection tablets like chlorine dioxide and iodine tabs are very useful tools. But it must be understood that chlorine dioxide tabs are actually poison in large amounts, and iodine can have adverse effects on health in certain circumstances as well. In addition, they cannot kill giardia, a type of parasite that causes stomach distress. However, with all that said they are very good to have as an emergency backup to boiling. Use them in conjunction with filtration if chemical contamination is a concern.

Filtering Water

There are many apparatus on the market today that will do a pretty good job and most products name a percentage of contaminants they will remove on the package. However, I go back to the cooking and say if we can cook, we can boil!

If you want to filter the water before boiling to remove turbidity or sediments or just to give yourself better peace of mind that it is as clean as you can get it on the fly or in a temporary camp, there are a couple of ways to create filters. You can also carry some type of pump filter to remove most contaminants prior to boiling.

You can build a makeshift filter. This is not difficult given the proper materials at hand. Make a tripod from 3 saplings about 2" in diameter and 6' long. Use 3 tiers of a fabric like a bandanna tied to the tripod to create nests that material can be placed into. The first layer should receive some course filtering media like grass or weeds, the second should be charcoal from the fire if possible (not ash), and the final tier should be sand.

Pour water slowly from the top and let drain through the tiers into a catch basin. Then boil the water that is in the catch basin. It may take a couple runs through the filter to get clean-appearing water. This will help filter large particulates from the water but will not replace a good ceramic-

type filter if available—a makeshift filter is an emergency measure. See Figure 1.1.

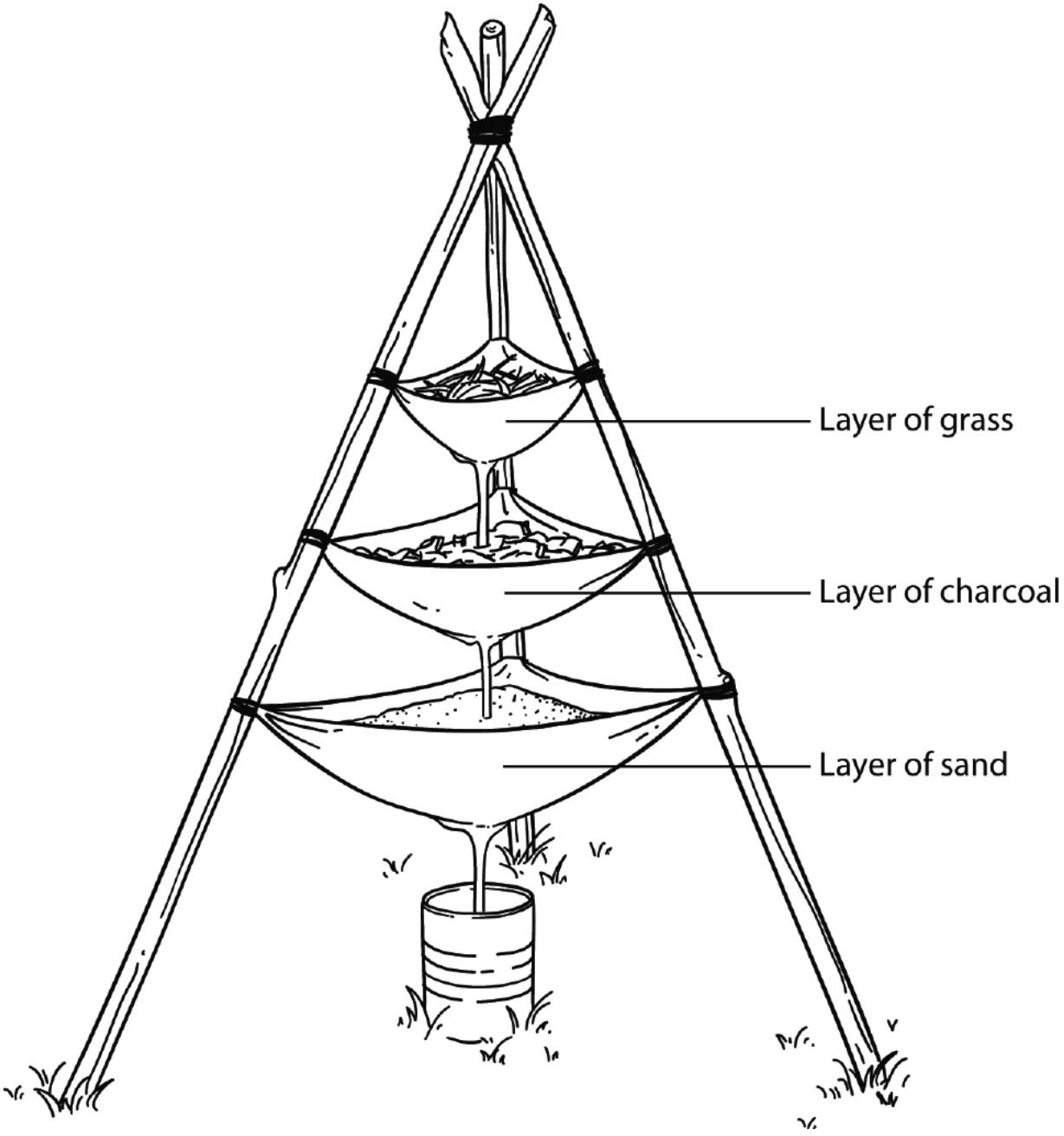

Figure 1.1 Tripod water filter

Another method is to use a 2-liter bottle top as a funnel, inverting it and placing it in the bottom portion of the bottle. You layer the same filter

mediums inside. See Figure 1.2.

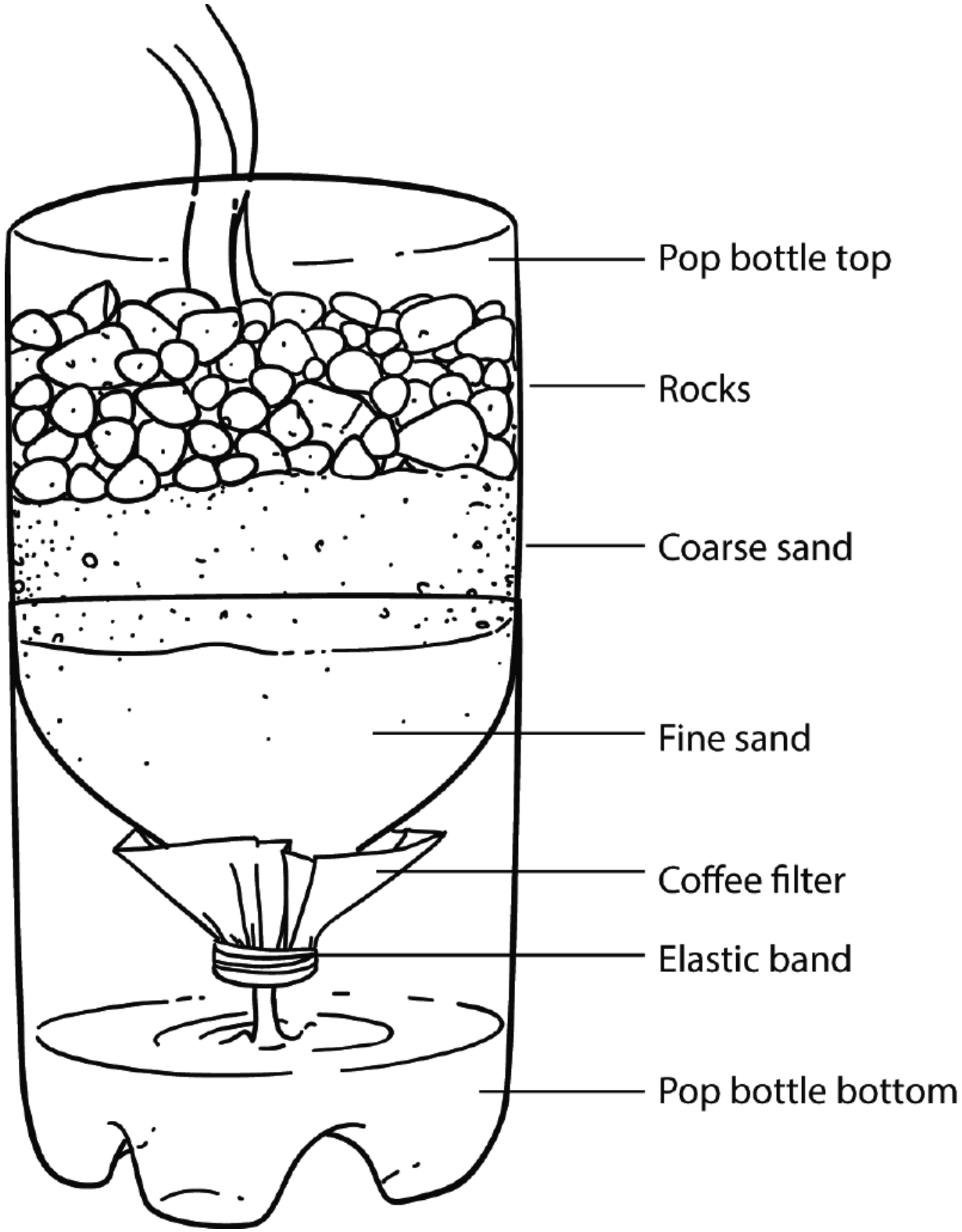

Figure 1.2 Funnel water filter

Boiling Water

To make water potable by boiling, bring it to a boil at 212°F (100°C). Letting it boil for 10 minutes will eliminate most of the bugs that cause intestinal distress. However, boiling doesn't remove chemical toxins, which is one reason you may also want to use filtering.

If you're boiling hard water—water with a lot of calcium salts dissolved in it—you'll find that a deposit will build up on your utensils. This can be removed with vinegar.

Boiling does not permanently eliminate microbes from the water. If the boiled water is stored, microbes can collect. So you only need to boil as much water as you are likely to use up in the near future.

Tips and Tricks

- For clothing, I recommend 10- to 12-ounce durable canvas pants like the tree-climbing pants offered by Arborwear. Long-sleeved, lightweight, canvas, button-down shirts are comfortable in all seasons, and cotton T-shirts take advantage of evaporative cooling in the summer.
- Moccasins, elk hide or buffalo, are handy when stalking game in dry leaves.
- Look for varieties of tents with mesh tops and a rain flap, which helps alleviate condensation issues.
- I prefer to carry packets of Emergen-C for daily use as an immune booster.
- Ceramic-type filters from companies like LifeStraw, Sawyer, and Aquamira are almost 100 percent effective for disinfecting

groundwater resources.

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Pine Needle Tea

Pine needle tea is high in vitamin C. Be careful on species selection as there are pines that are toxic if consumed. For example, you will want to avoid ponderosa pines, Norfolk Island pines (also called Australian pines), and yew trees (the yew is not a pine tree but is sometimes mistaken for one). Lodgepole and Monterey pines may give you digestive troubles.

To make a simple pine needle tea, bring water to a rolling boil and remove from fire. Add a handful of green needles. Chopped is best to release the volatile oils. Place a lid over the container and let steep about 15 minutes, then strain and consume. There is no set ratio of the number of needles to water. Just experiment to find what suits your taste.

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Chapter 2

Foods That Require Minimal Processing

"A crude meal, no doubt, but the best of all sauces is hunger."

—Edward Abbey, *Desert Solitaire*

Many of the foods today that we can carry require very little to no processing before consumption. You don't have to cook an apple in order to eat it—but the tradeoff is that apples can be heavy to carry. Lighter in weight and easier to carry are more processed foods like energy bars and similar types of food, but none that I have tasted make a meal that is fit for the woods. So consider carrying in food that requires a little preparation but which will provide a more satisfying meal to accompany your outdoor adventure.

Trail Mixes and Snacks

Trail mixes combine most of the needed food nutrients we want, and these are great snacks, although again not much of a meal for the woodsy traveler. Good trail mix contains a high-protein nut like a cashew or almond, some type of dried fruit like a raisin for concentrated nutrition, and chocolate for quick energy. You can make similar mixes at home.

Trail snacks, like pemmican and fruit leathers, can also be a good way to tame hunger pangs when you don't have time to stop and build a fire.

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Dave’s Homemade Trail Mix

This is about 3 days’ food if needed in an emergency.

- 1 cup dried bananas
- 1 cup raisins
- 1 cup Hershey’s chocolate morsels
- 2 cups cashew halves
- 1 cup pecans
- 1 cup walnuts

Mix well and store in a 32-ounce water bottle for carry.

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Simple Trail Mix

A simple, less expensive trail mix.

- 8 ounces raisins
- 8 ounces mixed nuts (or peanuts, an even cheaper option)
- 8 ounces sunflower seeds
- 8 ounces chocolate chips
- Salt, to taste

Mix together all ingredients. Add salt to taste. Enjoy!

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Simple Pemmican

You can make this pemmican ahead of time or at camp. If making it at camp, do everything except melting the lard well away from the fire so that the pemmican can solidify.

8 ounces beef jerky, finely minced
1 cup fresh raspberries
½ cup lard

1. Mash jerky and raspberries together in a bowl to form a paste-like mixture.
2. Melt lard. Stir jerky-raspberry mixture into pot, away from heat.
3. Pour into a sheet of cotton cloth (about 12" × 12") and twist into a ball. Let stand in a cool area to dry.
4. Once solidified this can be carried for days and eaten on the trail as needed.

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Fruit Leather

In a pinch, the leather can be dried on the dashboard inside a car.

1½ cups fresh raspberries
1 teaspoon honey

1. Purée the raspberries. You can use an egg beater, food processor, or mortar and pestle for this.
2. Add honey to raspberries and mix well.
3. Place a plastic sheet or polytarp section on a table. Spread the purée mixture in a thin layer onto the plastic. It should be about ⅛" thick. Leave in full sun to dry (be sure to keep insects away).
4. The leather is done when it is dry and can be peeled up in a sheet from the plastic. This usually takes 6–8 hours. If it is not done in a single day's heat, you can store, covered, in a cool place and repeat the next day.

Precooked or Pre-Prepped Foods

It does not take much of a fire to heat a kettle. Many foods are easily prepared within their packages now by just warming them. The biggest advantages to precooked or pre-prepped foods are the time they save and the packaging they come in, which prevents spoilage at ambient temperature. Many of these foods come in a single-serving bag or can serve 2 people. They also make great additives to other foods in larger recipes.

Bagged Foods

Many types of dried or easy-to-prepare foods come in bags and may be worth consideration. Good examples of foods that come in bags and are not packed in much liquid, saving space, weight, and room, are:

- Uncle Ben’s Rice
- StarKist Tuna
- Hormel Bacon
- Santa Fe Refried Beans

These are some of my favorite meals to make with bagged foods, like rice:

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Jerky and Rice Bush Pot

I like using Uncle Ben's Ready Rice for this as it is an easy, quick trail meal.

1 package precooked rice (8–9 ounces)
4 ounces beef jerky

Heat rice for several minutes in a pot of boiling water (leave in bag). Remove from heat. Cut open bag and add beef jerky, then close bag and let stand in the pot of hot water for about 20 minutes. Season to taste.

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Tex-Mex Bush Pot

This meal can stand alone or be served with a tortilla and grated Cheddar cheese.

1 package precooked southwestern rice (8–9 ounces)
1½ cups water
6-ounce can of precooked ground beef
1 teaspoon chili powder

Add rice to pot with water. Boil until the mix is heated and thickens. Add beef and chili powder. Cook until heated through. Serve.

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Chicken Casserole

You can use leftover chicken for this recipe instead of precooked.

1 package precooked wild rice (8–9 ounces)
1½ cups water
1 package precooked chicken (about 12 ounces)
2 tablespoons dehydrated vegetables
¼ teaspoon garlic
¼ teaspoon Old Bay Seasoning
Parmesan cheese, grated

Add all ingredients except cheese to pot. Cook down until thick on low heat. Top with Parmesan cheese and serve with bread or biscuits if desired.

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Curry Chicken and Rice

I like Uncle Ben's Butter & Garlic Ready Rice for this dish, but you can use your preference.

1 package precooked chicken (about 12 ounces)
1 package precooked rice (8–9 ounces)
1½ cups water
Curry powder, to taste

Add all ingredients to pot and cook over low heat until rice is cooked and chicken is heated through. Serve with bread.

Canned Foods

Canned foods are another example in the quick-and-easy category, but care must be taken to check just how much liquid is used in the canning of the product or you may be wasting weight carrying water and could easily substitute something else of less weight and bulk.

Now with that said, from where I stand there is one great advantage to canned food: You have a ready container after the fact for drinking or for cooking other food later without carrying a separate pot. This can be especially handy on a short trip.

The best types of canned foods have pull-top lids so there are no jagged edges from the opening process.

Foods in this category that are readily available are:

- Yoders canned meats
- Hormel Chili

- Campbell’s stews
- Van Camp’s Pork and Beans

Jarred Foods

Some foods that come in plastic jars don’t require refrigeration after opening and are worth a mention if for no other reason than emergencies. These foods include peanut butter and honey. Alone and without some type of bread or crackers, this is a rough lunch indeed, but it can become a welcome gift in an emergency. Peanut butter and honey are the perfect short-term survival foods in my mind. You will also find jams, jellies, and sauces come in jars and can add a special touch to a meal.

Unfortunately glass jars require special care to keep from breaking. They can be wrapped in things like a layer of bubble wrap or heavy cloth and then duct-taped for travel if needed. Most foods found in glass jars these days can be found in or transferred to plastic jars if needed.

Dehydrated Foods

There are also lots of foods on the market that are dehydrated and only require that water be added to make them very palatable and in most cases very tasty. I am not referring in this text to dehydrated camp meals in a bag, as I find the majority very bland indeed but instead mean inexpensive foods that can be added to other ingredients to make a meal. Again many of these type foods need only be added in some quantity to other bagged foods like rice or beans to make an excellent meal.

There are 2 types of dehydrated foods, those that require the addition of hot water and those that just require the addition of water.

JAHW (Just Add Hot Water)

If you’re going to be lighting a fire for cooking or warmth anyway, dehydrated foods that require hot water are simple to use and can add a lot of variety to your meals.

Soup greens by Harmony House are a good example. They can be purchased in bulk from many places and are a staple in my outdoor pantry. They add flavor to any meal as well as providing needed vitamins and nutrients.

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Hunter’s Stir-Fry

This is a great recipe that uses dehydrated soup greens.

2 tablespoons olive oil
2 tablespoons dehydrated soup greens, rehydrated
1 cup (or the amount to your liking) fresh game meat, diced
Seasoned salt, to taste

Add oil to skillet placed over a medium-hot part of the fire. Add greens and meat. Cook through, stirring occasionally. Add seasoned salt to taste, then serve.

Dehydrated potatoes are another great example of this. There are several brands as well as flavors out there. These can also be used to thicken a stew made in the pot; add while simmering.

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Rice and Sausage Dinner

You can use any kind of pork or game sausage for this dish.

½ pound sausage
1 package Knorr Rice Sides (about 5–6 ounces), flavor of choice
2 cups water
2 tablespoons instant potatoes

Brown sausage in skillet over medium flame. Add rice and water. Bring to a boil. Remove to a less hot part of the fire and let simmer. Add potatoes to thicken a few minutes before serving. Serve over fresh toasted bread.

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Quick Chicken and Dumplings

1 package precooked chicken (about 12 ounces)
1 chicken-flavored bouillon cube
½ of a 4-ounce package (about ¼ cup) instant potatoes
1 teaspoon dehydrated vegetables
¼ teaspoon Old Bay Seasoning
1 package just-add-water biscuit mix (about 7 ounces)

1. Add all ingredients except biscuit mix to bush pot. Fill about ¾ full with water. Bring contents to a boil and let reduce to ½.
2. While stew is boiling, prepare biscuit mix according to package directions. Drop 1" lumps into boiling liquid. Dumplings will form. Add a few at a time to a total of about 4–5.
3. When dumplings are cooked through (about 3–4 minutes), serve stew.

Bushcraft Tip

Other dehydrated foods for easy fix'n are many types of pasta-based meals, which are high in carbohydrates and taste delicious. I like to boil a package of pasta Alfredo, then add 1 package of precooked chicken (about 12 ounces) and Old Bay Seasoning to taste.

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Sausage Gravy

1 pound sausage (can be any sausage of game meat or pork)
1 packet (about 1 ounce) peppered gravy mix
1 cup cold water (or amount indicated on gravy mix packet)

Fry meat in pan on medium heat until browned. Add gravy mix and water. Stir on a lower heat until thick and sausage is cooked through. Serve on any breakfast bread or biscuit.

JAW (Just Add Water)

Many types of mixes for breads, cakes, cookies, pancakes, biscuits, and muffins are on the market now that only require the addition of water to make an excellent addition to or dessert for any camp meal. So many batter-type mixes are available now that it almost makes carrying the old standards of flour, baking soda, and baking powder obsolete. The usefulness of the JAHW and JAW foods is only as limited as the imagination.

There are a great many brands of these items on the market today. Sometimes the best places to find them are at discount and dollar stores. Look for mixes that specifically say “complete” or “just add water.” Biscuit-type mixes are very versatile and can be used for everything from drop biscuits to ash cakes to hush puppies to dumplings. They can be used as stew thickeners as well.

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Corn Fry Bread

This is a simple fry bread recipe using a just-add-water mix.

1 package (about 6½ ounces) just-add-water corn bread mix
Water as per mix instructions
1 tablespoon granulated sugar
Bacon grease or lard for frying

Stir together corn bread mix, water, and sugar. This should form a mixture thick enough to form cakes by hand. Fry in skillet with bacon grease or lard over medium heat, until browned on both sides.

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Hush Puppies and Cream Cheese

You may be used to eating your hush puppies with mayonnaise or ketchup (or nothing at all), but give cream cheese a try!

1 package just-add-water hush puppy mix
Water as per mix instructions
Vegetable oil for deep-frying
Cream cheese spread

1. Mix instant hush puppy mix in a bag with water to form a thick batter that will fall from a spoon in a lump. Heat 2–3" of oil in a skillet.
2. Once oil is heated, drop balls of mix into hot oil. They should rise almost immediately to the top. Turn once during cooking, Cook about 2–3 minutes each side. Remove when brown. Serve with cream cheese spread.

Tips and Tricks

- Mother Earth Products sells single vegetables in bulk dehydrated as well as fruits and other mixes for soups.
- You can repackage some items at home to reduce bulk and weight (throw out the box but keep the inner envelope, for example).
- One key safety element when reusing cans is to ensure, if you plan to drink from this container, that you check for sharp edges.
- The nutritional value of peanut butter alone makes it well worth having a small jar in any kit.

- Pancake-type mixes are much less versatile than other mixes but can be used for some things.
- Dried milk is a great asset if you choose a good brand. Country Cream is a good one for sure.
- Powdered eggs can replace fresh ones in anything needing them including just straight-up scrambled eggs or omelets. I recommend Sonstegard brand.

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Chapter 3

Whole Foods That Don’t Require Refrigeration

“After a good dinner one can forgive anybody, even one’s own relations.”

—Oscar Wilde

When deciding what foods to pack in, you want to avoid items that need to be kept cool or refrigerated. It is difficult to maintain a specific environment for your food so it’s a good idea to choose products that can tolerate tough conditions.

Many of these foods require cooking, but their preparation doesn’t have to be complicated or time-consuming. You’ll find a variety of recipes in this book that will show many different ways to prepare a few simple ingredients.

Vegetables and Fruit

Many vegetables and fruit can be carried for days without going bad and this makes them a viable option for camp cooking. But remember this: these fresh items hold lots in the way of liquid weight and take up some space in bulk, so there is the tradeoff. A dehydrated or otherwise preserved version of these foods will generally take up less weight and space. However, in most cases any fresh item will taste better than something preserved, as well as being more nutritious.

You will need to experiment with this a bit and much of your testing can be done at home before setting off. This is something that just has to be figured out over time by carrying such foods and observing their condition over days. Some things can be tested in the home by leaving food out much like you do bananas on the countertop and then seeing what happens, but this may not replicate exact conditions in the outdoors due to the controlled environment we create in the home.

Seasonality, humidity, temperature, and environment all affect how long these items last without refrigeration, but for me the best candidates that are commonplace for carrying fresh would be:

- Potatoes
- Carrots
- Apples
- Oranges
- Onions
- Zucchini
- Summer squash
- Other thick-skinned varieties of fruit and vegetables

The more fragile the food is to begin with, the more likely it is to bruise or go off before you have a chance to eat it. Delicate berries like blueberries and raspberries are better used as quickly as possible or picked wild and used in camp instead of carried in.

Dehydrating can be done in the home with modern dehydrators, and this makes a convenient way of packing these type foods. They can also be purchased dehydrated online and in specialty shops, as well as local groceries for some of them. Dried and dehydrated items will work in about all applications and have much less chance of spoilage over time.

When planning meals with fruit and vegetables, remember that storing leftovers can be a challenge—half a potato will go brown and spoil much sooner than a whole potato will! So try to use a whole item for your meal.

Cured Meats

Cured meats like salt pork are a great addition to a camp pantry as a meat supplement, and salt-cured bacon has been a staple carry for woodsmen for several hundred years. These meats will last a good long time without refrigerants but are not commonplace in markets in most of the U.S. like they used to be.

Cured meats have had some combination of salt, sugar, and/or nitrates added to them to help preserve them. Curing meats also gives them an attractive flavor and color. Dry salt cures used to be common, and the process was called corning (which is why we have “corned beef”). Today salt water is often used and the process is called brining or pickling.

Cured and smoked hams can be very expensive to buy and time-consuming to make. However, again there is the tradeoff of very tasty and nutritious food that did not come from a package. It can be a great addition if conveyance is available.

Smithfield makes the most readily available cured bacon that can be packed and not refrigerated. Other sources can be found at local country butchers.

A single man can carry a couple of pounds of salt pork and eat well with just a few added sundries. There is absolutely something to be said for a couple slices of hot bacon and an ash cake with a good cup of coffee the morning before a hunt.

Grains

Many processed grains make excellent choices for the camp kitchen but the one I prefer most is farina, also known to every small child as Cream of Wheat. It makes a good meal when cooked with hot water and is easy to carry.

Many types of oats and oatmeal are also available and they make it easy to cook a filling and nutritious breakfast even if you have little in the way of cookware. Instant oats can be made just by adding hot water. Old-fashioned oats need to be boiled.

Oats and farina can also be added to many other recipes to make other meals, making these grains multifunctional, which to me is an important consideration. Carrying grains in the form of meal like cornmeal really makes a lot of sense. You can carry a JAW packet and use it like the raw ingredient. For example, corn bread mix can be made into an excellent cornmeal mush.

Grains I like include:

- Quaker Oats
- Nabisco Cream of Wheat
- Malt-O-Meal Hot Wheat Cereals

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Cream of Wheat Pancakes

This is one of my favorite breakfast recipes, using one of my favorite grains.

1 egg
1½ cups milk
1 teaspoon oil (vegetable or corn)
1 cup all-purpose flour
2 teaspoons baking soda
½ teaspoon salt
¼ cup Cream of Wheat
Oil or lard for cooking (a few tablespoons)
Honey or syrup for serving

1. Mix ingredients except oil and honey/syrup. This should form a thick batter.
2. Add about a tablespoon of oil or lard to a skillet and heat to about medium over the fire. The skillet is ready when a drop of batter placed in the skillet sizzles.
3. Spoon about ¼ cup batter per pancake on the skillet. Cook until golden brown around the edges (2–3 minutes), then turn and cook until done (another 2–3 minutes). Add additional oil if needed to cook additional pancakes.
4. Serve with honey or syrup.

Tips and Tricks

- Remember that hard cheeses like Cheddar don’t have to be kept refrigerated but may not hold up well if carried in hot temperatures for long periods.
- Rinse all fruit and vegetables with water before using.
- While you might be tempted to cut up some of these foods ahead of time (like pineapple or melon), remember that you will have to keep cut-up fruit and vegetables cool, which can be a challenge—particularly if you’ll be out in the bush for an extended period.
- Nuts are another whole food and are easy to carry, store, and eat!
- Plan your meals ahead of time so you’re not left with half-used fruit and vegetables that you have no way to store.

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Chapter 4

Supplemental Foodstuffs

"Part of the secret of success in life is to eat what you like and let the food fight it out inside."

—Mark Twain

We've covered the basic building blocks of what you need to think about packing in—the main foods that will make up the bulk of your meals. But you will also want to think about packing in supplemental foodstuffs—items that will enhance your experience without adding too much bulk or take up too much space. For example, carrying dehydrated milk lets you fix a simple breakfast cereal without too much effort—and without having to light a fire.

Basic Ingredients

With all the types of food choices we have discussed prior to this point you may ask, "Why carry so many ingredients and powders like flour and baking powder?" Well, the simple answer is that there really is no need, especially for a shorter-term camp or trip.

However, there are some ingredients you'll want to carry even if you're planning to make most of your meals from JAW packets. One of these is salt. The other is baking soda. Its uses are so many as to make it worthwhile to carry even if you never cook with it.

Uses for baking soda:

- Toothpaste
- Dishwashing
- Dry shampoo
- Deodorant
- Stain removal
- Cleaning metal tools
- Antacid (medicinal)
- Treating insect bites (medicinal)

Spices

I believe in carrying items that have a multiuse element and spices are no different. Many spices are also medicinal so your camp cupboard also becomes the medicine chest. Spices should be used on wild game very sparingly as they have a full flavor all their own that only requires a bit of salt in the end to make them very pleasing and palatable.

However, there are many uses in cooking with spices that help the body at the same time that they flavor our food:

- **Cayenne** has the ingredient capsaicin, which is used in many prescription and over-the-counter medicines to help relieve pain. It is believed to be an anti-inflammatory. If you're feeling a cold coming on, some cayenne sprinkled on your lunch can help reduce congestion.
- **Cinnamon** has antibacterial and anti-inflammatory properties. It can help improve blood sugar control and reduce triglycerides and total cholesterol, so it is thought to be heart-healthy.
- **Clove** is another spice with anti-inflammatory properties. It may also reduce cartilage and bone damage caused by arthritis. You can bite down on a clove to help reduce the pain from a toothache.

- **Coriander** can help calm digestive tract problems, like irritable bowel syndrome. It is also an antioxidant.
- **Garlic** is thought to help reduce cholesterol levels and has antioxidant properties. Garlic can be harvested wild in many areas of the U.S. in spring and summer. A good rule of thumb is to make sure the plant smells like garlic! If it doesn't, it probably isn't garlic and may be harmful to eat.
- **Ginger** is used in many cultures as an aid to digestion. It is also an anti-inflammatory and has shown promise in preventing migraines. Many people have found it helps with nausea.
- **Mustard** helps break up congestion (similar to cayenne) and making a footbath with a little mustard powder added to water can help treat athlete's foot.
- **Nutmeg** may have heart-protecting properties and it appears to kill certain cavity-causing microbes.
- **Sage** may protect the brain against Alzheimer's, according to several studies. It has anti-inflammatory and antioxidant properties.
- **Turmeric** is used in some cultures as an aid to digestion. It is also an anti-inflammatory.

See Chapter 18: Foraging, for more information on medicinal uses of herbs and other plants.

Winter cress (edible)

Honey

Honey is almost a perfect food. It has so much nutritional value it could stand alone as a short-term survival food. It has the obvious benefit of lasting virtually forever—it has been found in Egyptian tombs and still viable to this day. It is a great source of daily energy and a fantastic medicine, making it multifunctional in the camp kitchen. It can replace any syrup for pancakes or biscuits and makes a great sugar replacement for teas and coffee.

Bushcraft Tip

Honey has been used in medicine for thousands of years. It was used to treat wounds and infections. Some kinds of honey have been shown to have an antimicrobial property. Nowadays, honey is being used more and more frequently to help treat ulcers and skin infections.

Cocoa, Teas, and Coffee

Every campfire needs a kettle for water specifically being heated for one thing: the camper's favored drink. Nothing goes down better to many folks than a warm drink in the morning as well as after a nice evening meal. The best thing about beverages in general is that the main ingredient comes in powder form, making it easy to both store and carry.

What could be more traditional than hot cocoa around the campfire? Is there any better way to lift your spirits after a cold day? There are many types of hot cocoa mixes that will suit a camper's needs, and the chocolate flavoring can be added to other ingredients to make chocolate-flavored desserts, if you're of a mind to do so.

I prefer to carry a chocolate milk powder made from actual milk. I find the Country Cream brand works very well. It can be used in some other recipes calling for milk to add a chocolate twist—such as with cookies or breads and cereals like oatmeal and farina.

Many types of teas have medicinal or side benefits in addition to be being revitalizing and warming. Some herbal teas, like chamomile, can help you relax and unwind after a long day at camp. Most folks these days seem to prefer tea bags over brewing loose-leaf tea using a tea ball when camping

out, but a tea ball allows you to make medicinal teas as well. Try out a few varieties at home before packing any along.

Bushcraft Tip

Chaga (chaga mushroom) is a type of fungus that grows on birch trees. It has anti-inflammatory and antioxidant properties and is thought to contain cancer-fighting compounds. Chaga can be used like any other tea and ground before adding boiling water to it or it can be used in a chunk and placed in a kettle of hot water to steep. In addition to its medicinal benefits, this naturally occurring fungus also makes a great fire tinder resource, being one of the few items that will ignite when dry with a low-temperature spark.

And we can't forget coffee. Coffee is an American tradition, as romantic as the cowboy era. A nice pot of hot coffee makes the weary camper rise to any morning occasion simply by the smell. What type of coffee you carry is a personal preference as is the form you carry (ground, instant, or beans). If you are a coffee drinker, far be it from me to tell you how to make it—everyone has a favorite method.

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Cowboy Coffee

In its simplest form for camping and tramping I prefer just ground coffee I can add to the pot.

1 heaping tablespoon ground coffee per 1 cup water, adjusted to taste

1. Add coffee and water to a lidded pot or coffeepot and place over a hot fire. Bring to a boil.
2. Let the grounds settle, then add a bit of cold water to further settle the grounds. Pour and enjoy.

Tips and Tricks

- Don’t throw away used tea bags. Used tea bags can make an emergency first-aid item as a poultice, being astringent in nature.
- Old Bay Seasoning mix is one of my favorites. I use it in many recipes. Having a spice mix along cuts down on the number of individual spices I need to pack in.
- You can purchase citric acid in powder form to take the place of vinegar and lemon and lime juice.
- Carrying spices in their original containers can get bulky, so you can transfer them to labeled snack-sized storage bags, stackable pill containers (the kind you can buy at the drugstore), or any small plastic container you have on hand.
- You can reuse your coffee grounds a time or two, although the coffee gets progressively weaker, so you’ll use more grounds per cup.

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Part 2

Bushcraft Cooking Methods

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Chapter 5

Cooking in the Wild

"There is no technique, there is just the way to do it. Now, are we going to measure or are we going to cook?"

—Frances Mayes, Under the Tuscan Sun

When I'm in camp, I don't necessarily break out a recipe book in order to make some tasty rabbit stew. I just use what I have on hand. So don't think you have to follow my recipes exactly or use the same ingredients I use. Think of the recipes in this book as a guide, not a rule. Here are some of my most important tips about cooking in the wild:

- Recipes are interchangeable. If you have a recipe you like for cooking red meat, then you can use it to cook raccoon.
- Think of opossum as pork. Whatever you do with that white meat, you can do with opossum.
- You can treat birds like chicken or turkey. If you've got a favorite chicken recipe, it'll probably work on a duck, too.

Chuck Box Contents

The chuck box is your kitchen cabinet in the woods and is also your storage for these items when not in use. They have been known to Scouts for years as the patrol box and have also been called the grub box. This, along with the hearth, is the center of the camp cook's operations. This box was

traditionally made from wood and is divided into smaller storage areas, sometimes with sliding boxes to be used as drawers when stood on end. Many of these boxes have folding or detachable legs to get them up higher for comfort in working, and the lid folds down to function as a work surface. See Figure 5.1.

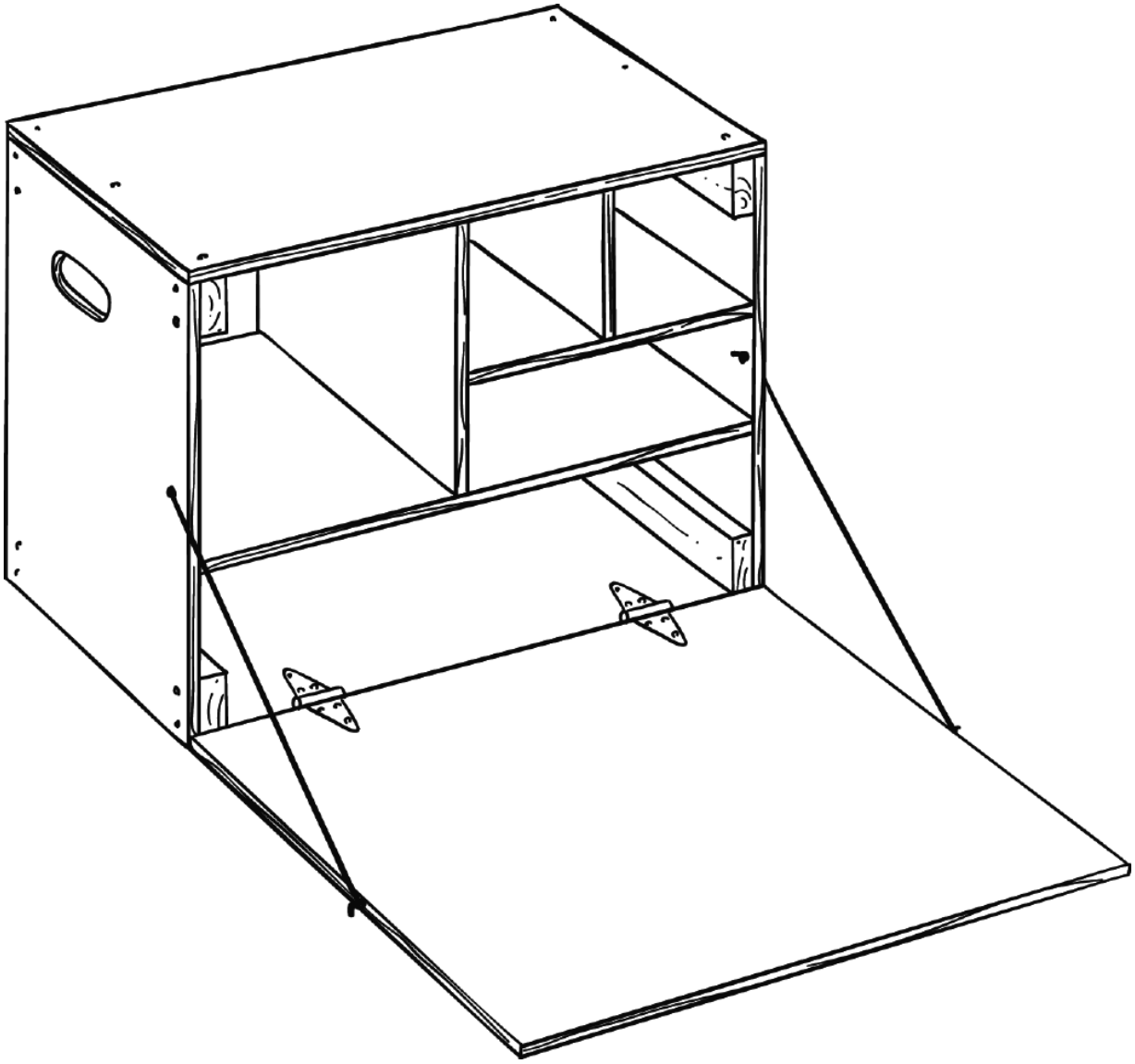

Figure 5.1 Chuck box

Containers and Serving Ware

- Dutch oven. A 2-quart version will feed 2 people.
- Steel skillet. An 8" will be good for 2 people; add 2" per person.
- Water container. This can be a canvas bucket to save space and should be at least 1 gallon per person.
- Measuring cup. This can be a dedicated device or improvised from your personal kit if graduations are on your cup or it is exactly 8 or 16 ounces.
- For serving, personal vessels can be used from backpacks or you can keep 1 small cup, bowl, and plate for each in the camp party.
- Eating utensils. Each member of the party should have a fork and spoon; these can be individually carried or kept as part of the chuck box.

Cook Utensils

If you are using cast-iron cookware, be sure to use wooden utensils, not metal, as metal can scratch the cast iron.

- Stirring spoon
- Serving spoon
- Spatula
- Whisk
- Camp knife
- Oven mitt
- Ladle

Extras

- Cutting board
- Leather gloves

- Lid lifter for the Dutch oven
- Trivet (a 6" version works well for most needs)
- Marinade syringe
- Natural bristle scrub brush

Foodstuffs for the Chuck Box

Most of the things I carry on the trail for quick cooking are in dry form. This saves water weight in the pack, and then water is added from a more localized source.

- I always carry beef and chicken bouillon powder. It’s light and adds great flavor to soups and stews.
- Stews and gravies can be thickened using potatoes, evaporated milk, or powdered eggs. Be flexible; if you don’t plan to use evaporated milk for other cooking, then don’t bring it. Plan on using potatoes or powdered eggs in your stews instead.
- Self-rising flour should always be carried as this avoids the need for yeast.
- A seasoning mix or Old Bay can be used as a replacement for any other series of spices and even for plain salt. It also works for making jerky and for smoking meats, so it is a good resource to carry.
- Animal fats can be used to replace oils and lard. Remember that the fat of wild game will be similar to another animal of the same meat coloration, so opossum is most similar to suet and deer and raccoon are similar to lard.

Common Substitutions

If a recipe calls for an ingredient you don’t have with you, you may be able to find a reasonable substitute in your pack or in the environment around you. For example, chicory or roasted dandelion root can be steeped to make a good coffee substitute.

Simple Ingredient Substitutions		
Ingredient	**Amount**	**Substitute**
Beef or chicken broth	1 cup	1 tablespoon soy sauce + 1 cup water less 1 tablespoon
Cheese	Any amount	Cheeses with similar texture and moisture content like Cheddar, Colby, and Monterey jack can be used interchangeably, as can cheeses like Parmesan, Asiago, and Romano
Chocolate		1 ounce unsweetened chocolate (1 square) is equivalent to ¼ cup cocoa powder; 1 cup semisweet chocolate chips is equal to 1 cup other flavored chips or 1 cup chopped nuts or 1 cup dried fruit
Cream of . . . soup	1 can	Any cream of . . . soup can be interchanged—cream of mushroom can be substituted for cream of celery; cream of chicken can be used in place of cream of mushroom, etc.
Corn syrup	1 cup	1¼ cups granulated sugar plus ⅓ cup water; or 1 cup honey
Dried fruit	Any amount	Raisins, dried currants, dried cranberries, and pitted prunes can be used interchangeably
Egg	1 whole egg (about 3 tablespoons)	2½ tablespoons powdered egg plus 2½ tablespoons water; or 3 tablespoons mayonnaise
Fats	½ cup	½ cup butter is equivalent to ½ cup less 1 tablespoon vegetable oil or ½ cup shortening or lard
Flour, self-rising	1 cup	⅞ cup all-purpose flour plus 1½ teaspoons baking powder and ½ teaspoon salt
Grains	Any amount (cooked)	White rice, brown rice, wild rice, barley, and bulgur can all be used interchangeably
Herbs		1 tablespoon chopped fresh herbs is equivalent to 2 teaspoons dried herbs
Honey	1 cup	1¼ cups granulated sugar plus ⅓ cup water
Milk	Any amount	Substitute the same amount of water or juice

Nuts	Any amount	Most nuts are interchangeable in recipes
Oils for baking	Any amount	Any equivalent amount of fruit purée, such as applesauce
Oils for frying	Any amount	Any equivalent amount of lard or shortening
Onion	Any amount	Green onion, chopped leek, chopped shallots, or regular onion can be used interchangeably
Sugar, granulated	1 cup	1 cup brown sugar or 1¼ cups confectioners' sugar or ¾ cup honey or ¾ cup corn syrup
Vinegar	1 teaspoon	1 teaspoon lemon or lime juice

Tips and Tricks

- If you have room in your pack, aluminum foil is a handy item to have along. Wrap some leftovers in it, place in hot coals, and in 15 minutes you've got a nice warm meal.
- Use disposable water bottles to carry liquids, like vegetable oil. For smaller amounts of liquid, use the small plastic containers meant for carrying on shampoo and soap. These are readily available at drugstores.
- Test out recipes and substitutions at home before hitting the trail. This can help you make adjustments before you leave.
- For shorter trips, consider packing premeasured ingredients for each meal in a storage bag. This simplifies the cooking process, and you won't have to pack in measuring cups and spoons.
- If you camp a lot, dehydrating food at home can help you save on weight and bulk.

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Chapter 6

Building a Fire

"The glories of a mountain campfire are far greater than may be guessed . . . One can make a day of any size, and regulate the rising and setting of his own sun and the brightness of its shining."

—John Muir

Fire is the key element to a successful outdoor adventure. Without fire we are at the mercy of the sun to do our cooking unless we happen to be camped on a lava field, so the first priority is learning to make a proper fire.

Cook fires are different from campfires, signal fires, or warming fires, and they must be built and handled in accordance with the way we will cook our food.

A fire requires three elements: heat, oxygen, and fuel. If any of these elements is missing or is not in the proper amount, the fire will dwindle or die out.

Picking the Right Wood

The first consideration in building a fire is to choose what type of wood to collect. Which you choose depends on what kind of fire you're making:

- Softwoods (such as cedar) are for starting fires.
- Hardwoods (such as oak) are for sustaining fires and cooking fires.
- Resinous woods (such as pine and spruce) make great campfires and signal fires but they make horrible cook fires and can impart a bad flavor to anything the smoke comes into contact with.

So to that end we must first understand a bit about wood in general. There are really two types of trees:

1. **Deciduous:** those that lose their leaves every year
2. **Coniferous:** those with needles; for the most part these trees lose needles all year long and replace them with new ones

A deciduous tree is not always a hardwood, and a conifer is not always a softwood. To add to the confusion both types of trees can have resins, or oils, that impart bad taste to food, especially meat being cooked directly over flame or coals. So how do you tell the difference if you are not a tree guru? The answer can be a fairly simple deduction in most cases.

First, stay away from any coniferous tree except for lighting the initial fire. Feed no coniferous fuels. For deciduous trees (non-birch species), split the piece you plan to use and try to impress a fingernail into the wood. If you leave a mark, then don’t use the wood, unless it is for quick fire starting. Softer woods will ignite much faster, but hardwoods will create much better cooking coals and fires. See the following table for more information on the various BTUs put out by different types of wood.

BTUs for Wood Burning								
Species	**Heat per Cord (Million BTUs)**	**% of Green Ash**	**Ease of Splitting**	**Smoke**	**Sparks**	**Coals**	**Fragrance**	**Overall Quality**
Black locust	27.9	140	Difficult	Low	Few	Excellent	Slight	Excellent
Black walnut	22.2	111	Easy	Low	Few	Good	Good	Excellent
Bur oak	26.2	131	Easy	Low	Few	Excellent	Good	Excellent
Eastern red cedar	18.2	91	Medium	Medium	Many	Poor	Excellent	Fair
Honey locust	26.7	133	Easy	Low	Few	Excellent	Slight	Excellent
Larch (tamarack)	21.8		Easy-med		Many	Fair	Slight	Fair
Lodgepole pine	21.1		Easy		Many	Fair	Good	Fair
Maple (other)	25.5	128	Easy	Low	Few	Excellent	Good	Excellent
Mulberry	25.8	129	Easy	Medium	Many	Excellent	Good	Excellent
Osage orange	32.9	165	Easy	Low	Many	Excellent	Excellent	Excellent
Ponderosa pine	16.2	81	Easy	Medium	Many	Fair	Good	Fair
Red oak	24.6	123	Medium	Low	Few	Excellent	Good	Excellent
Rocky Mountain juniper	21.8	109	Medium	Medium	Many	Poor	Excellent	Fair
Silver maple	19.0	95	Medium	Low	Few	Excellent	Good	Excellent
Spruce	15.5	78	Easy	Medium	Many	Poor	Slight	Fair
Sycamore	19.5	98	Difficult	Medium	Few	Good	Slight	Good
White oak	29.1	146	Medium	Low	Few	Excellent	Good	Excellent
Willow	17.6	88	Easy	Low	Few	Poor	Slight	Poor

Starting the Fire

Once you know what type of wood to use, your next step is to understand the basics of building a fire. The key to starting a fire is simple: gather lots of tinder, lots of kindling, and lots of fuel.

- Tinder is highly combustible materials. This could be inner bark, dead weeds, or fine shavings from larger material. Often the best tinder for *starting* a fire is a heavily resin-laden wood, like pine, or bark from trees containing oils, such as birch. Again these are for starting the fire, not maintaining it.
- Kindling is small dry sticks from pencil lead to pencil size. Quickly establishing a fire requires lots of surface area of combustible material, so using lots of smaller pieces of kindling will help you establish your fire.
- Fuel is hardwood that is thumb-sized to 2" in diameter.

Make sure your selected area for the fire affords protection from high wind and allows for ease of maintenance. Make sure that the area you plan to build the fire is dry. If the ground is damp, place a layer of dry sticks on the ground to keep the base of the fire dry, lest it suffer from conductive heat loss and evaporative moisture, making it much harder to keep the fire going.

Next, process your tinder materials as fine as possible. This is a critical element that makes many folks fail in the earliest stage of fire building. Again you want the maximum surface area to give you the best chance of ignition.

Place a tinder bundle on the ground if it is dry or on the tinder base you created if it is wet. See Figure 6.1 for an example of a tinder bundle.

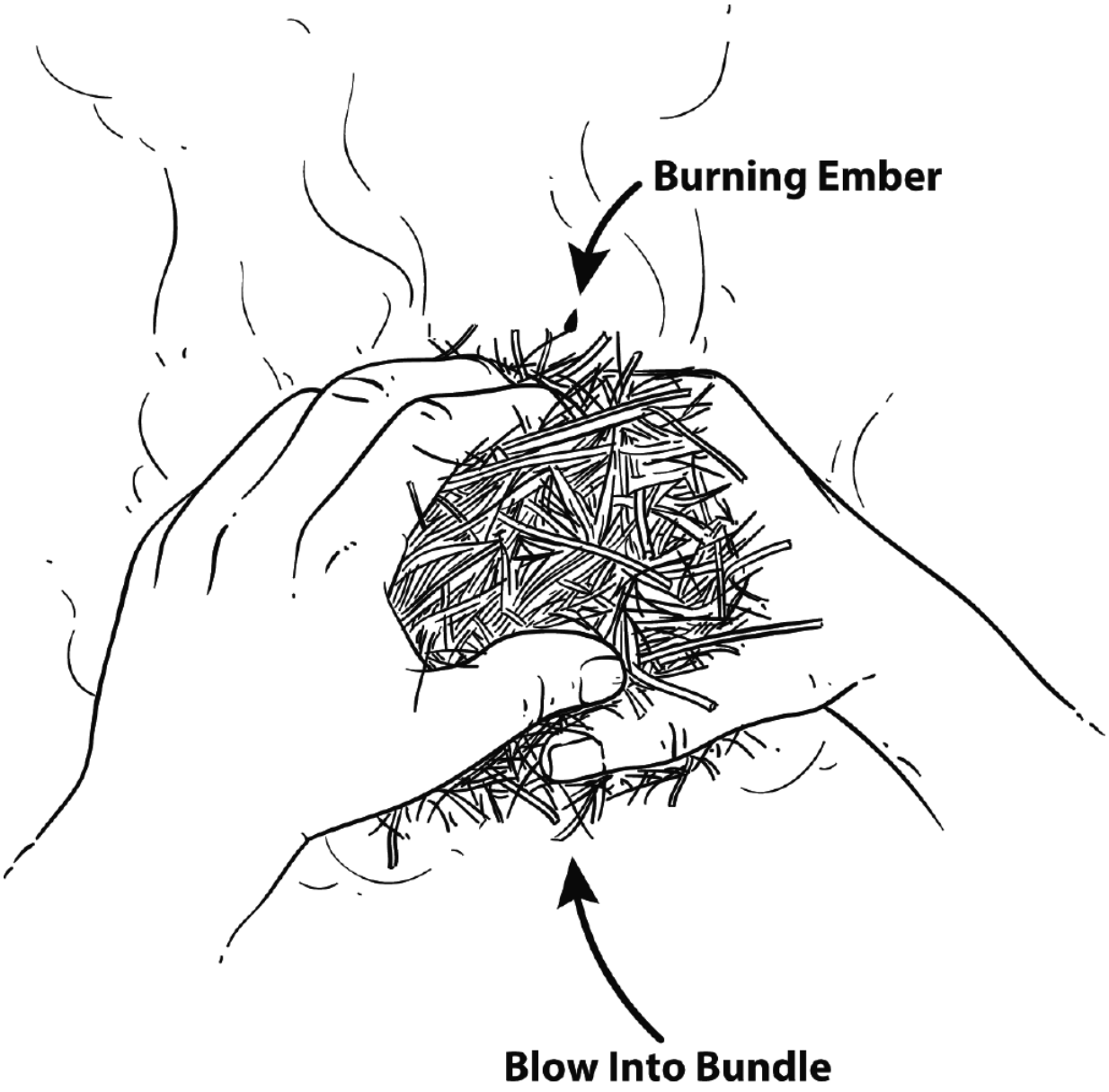

Figure 6.1 Tinder bundle

Now take another good handful of kindling and gently place it over the pile of tinder. Don’t overcomplicate this by building a Lincoln Logs–style home. Just ensure the sticks have plenty of air space between them. Crisscross as much as you can, building up not out. Fire loves chaos! See Figure 6.2 for an example of a fire lay.

Figure 6.2 Fire lay

1. Once you have set your fire lay, you are ready for ignition. Make sure you have at least as much or more tinder set aside as you have used to build the initial lay and 2 times that much fuel before proceeding to lighting the fire.
2. Once ready, you can ignite the base of the tinder material. A good space should be left open for this operation to allow good flow of oxygen from the bottom to create updraft from heat rising and pulling air into the fire from the bottom.
3. Once the fire begins to burn do not rush to add more material. A simple rule is: only add kindling when the flames have risen above the current level of fuel. This will prevent you from suffocating the fire through lack of oxygen.
4. Once the fire is established and kindling is burned, you may begin to add fuel to maintain the fire. It is a complicated-sounding process but gets easier each time you do it. Remember that wet or damp wood will starve the fire of oxygen through evaporation and also reduce heat. If your fuel is marginal, add more slowly and use more kindling as needed to increase heat. Place damp fuels near the fire to begin drying and remember to

split any damp wood at least once to expedite the drying process and possibly expose dry wood inside.

After building a fire as outlined, you can immediately place a kettle or pot of water on to boil. Once the kindling becomes coals, you are ready for the pan and frying. This fire will last about 20 minutes or so and is perfect for a quick lunch stop and hot meal.

Testing the Heat of the Coals

You will want to have a good guess as to the heat of the fire especially for baking and roasting, so here is a simple way to make a good guess. Place your hand above the coal bed at cooking level and count the seconds you can comfortably hold it there with your palm down toward the fire:

- 5 seconds = low
- 4 seconds = medium
- 3 seconds = medium-high
- 2 seconds = high

If you have the means, the surest way to tell if your meat is fully cooked is to use a thermometer placed in the thickest part of the meat to verify it has reached safe temperatures. If you do not have a meat thermometer, it’s better to cook in a way that ensures thorough cooking, like boiling or stewing. At a minimum cook the meat until it is an even color down to the bone and there is no sign of pink or blood.

Minimum Safe Temperature for Meat and Fish	
Meat	**Minimum**
Pork	160°F
Beef	145°F
Lamb	160°F
Chicken	165°F
Duck	165°F
Fish	145°F
Most game (deer, elk)	145°F
Rabbit and other small game	160°F

Advanced Fire Craft

Fire is the tool that many consider only second in importance to a good cutting tool. Fire is a main tool for combating cold-weather injury as well as general comfort around camp in cold environments. It will disinfect water, cook and preserve food, make medicines, keep bugs at bay . . . and the list goes on.

Sources of Ignition

Plenty of items on the market today—from actual lighters to road flares—will almost always ensure a flame to ignite even marginal tinder sources. You should have three methods to effect ignition at all times: lighter, ferrocerium rod, and sun glass or magnifying lens. I have not included matches on this list as it is my belief that matches really can do nothing we cannot accomplish with these three methods. Matches are not a value-added item, especially for the inherent issues one may face when using them, like moisture, wind, and gross motor dexterity when you're cold. However, matches should be practiced along with any method of fire starting in case you have those and nothing else.

The other two most important methods of fire starting to understand are the bow-and-drill and flint-and-steel methods. Both of these methods can be effected from material in the landscape provided you have not lost your high-carbon blade from the sheath on your hip. (You should always have some type of retention for your blade so that this is not a possibility.)

The Bow-and-Drill Fire Method

The bow-and-drill kit can be made using only stone or glass tools but a knife makes the job much more convenient. There are those that would tell you that to truly practice a primitive skill you must always use primitive tools, and there is something to be said for improvising tools from the landscape, but these days it is not hard to find materials like metal and glass to work with.

Bow-and-Drill Kit

The bow-and-drill method is basically the idea of rubbing two sticks together to create a friction spark. However, it is slightly more complex than that and requires a number of elements to work.

You will need four things in your kit:

1. Bow and bowstring

2. Spindle (also called the drill)
3. Hearth board
4. Bearing block (also called the handhold)

Except for the rope (ideally made of nylon), all of the items in this kit can be made from the landscape but it's easier to make the kit ahead of time to carry with you. See Figure 6.3 for what this kit looks like.

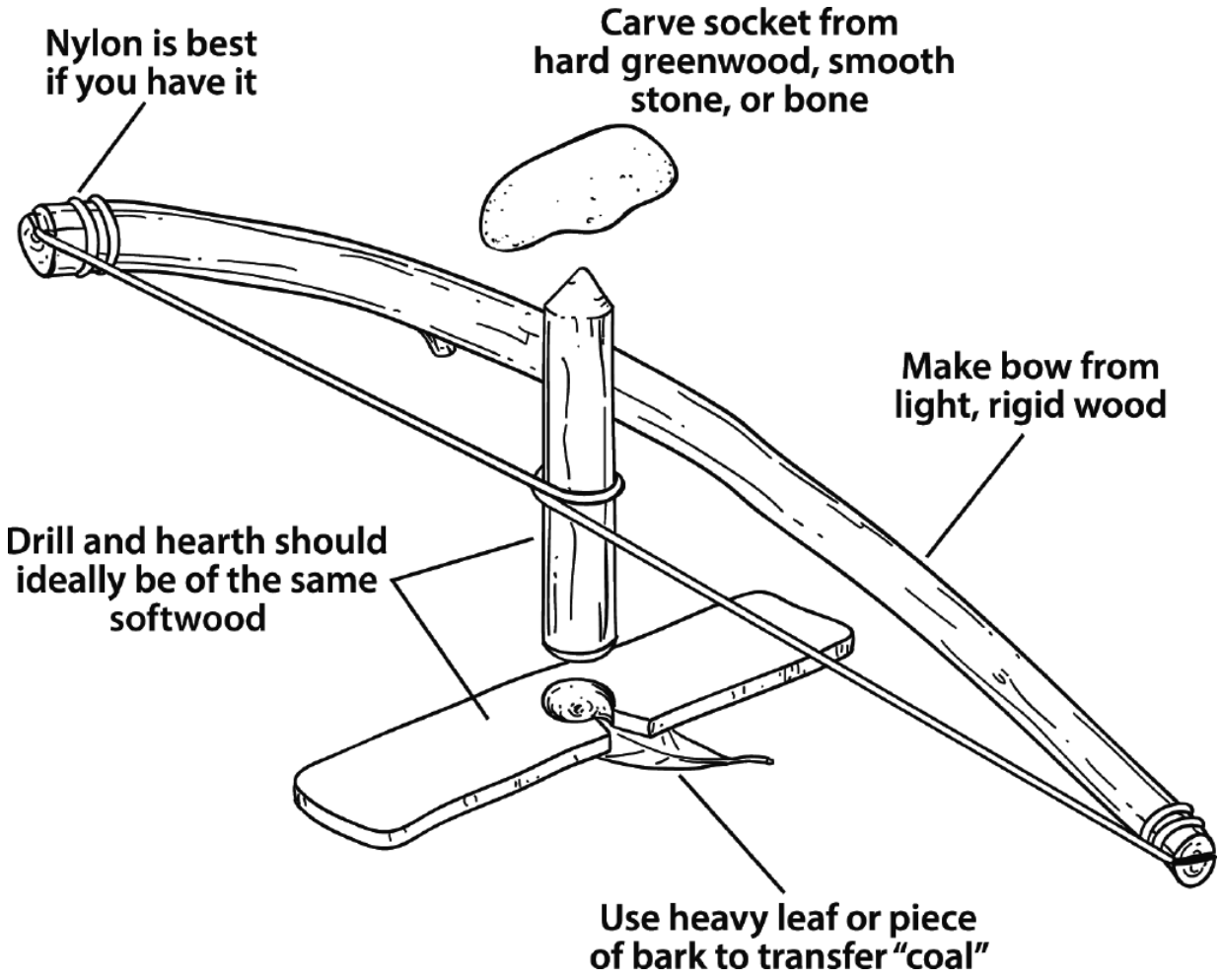
Nylon is best if you have it
Carve socket from hard greenwood, smooth stone, or bone
Make bow from light, rigid wood
Drill and hearth should ideally be of the same softwood
Use heavy leaf or piece of bark to transfer "coal"

Figure 6.3 Bow-and-drill fire kit

The basic technique is to wind the spindle into the bowstring in the bow, then rotate the spindle against the hearth board, using a handhold to keep the hearth in place. Doing this, you create an ember, a smoldering coal that will need to be added to a bird's nest of combustible materials.

Remember, we need heat, oxygen, and fuel to effect ignition or make the smoldering coal. So our set must be made to take maximum advantage of all three of these inputs. Survival is like a manufacturing process: All inputs will affect the output, in this case the burning coal. Any variation must be avoided to control the correct output. Understanding this, we need to ensure many things at the same time; without certain inputs, in the correct order, we will not get the desired output.

Creating the Bow-and-Drill Kit

When these components are used correctly they will make a simple machine that causes dust to accumulate. That dust is then heated by the drill's friction on the board. Choosing the correct components, using the right form, and understanding when and how much pressure and speed to apply are the key inputs to the process. The only variation should be the materials you select, which can be controlled for the most part.

The hearth and spindle can be made from the same wood. It should be a softer wood, one that you can leave a fingernail impression in by pushing down. Examples of good woods to select are poplar, cedar, willow, and pine. The wood for these two components must be as dry as you can manage to find but should not be in a state of decay. My preference for this material would be tulip poplar, as the lower branches will often be hanging dead from the tree and be off the ground and dry, barring a few days of hard rain.

Generally speaking you want your hearth board about as long as your forearm and as thick as your thumb when finished, so select a limb or piece of wood larger than this so it can be split down to make a flat board of these dimensions. The spindle of the same material can be made from a branch as well and need only be about thumb diameter and the length of the span from your outstretched thumb to your pinky; a bit longer will not hurt as you will be carving both ends.

See Figures 6.4 and 6.5 for examples of what the spindle and hearth board look like.

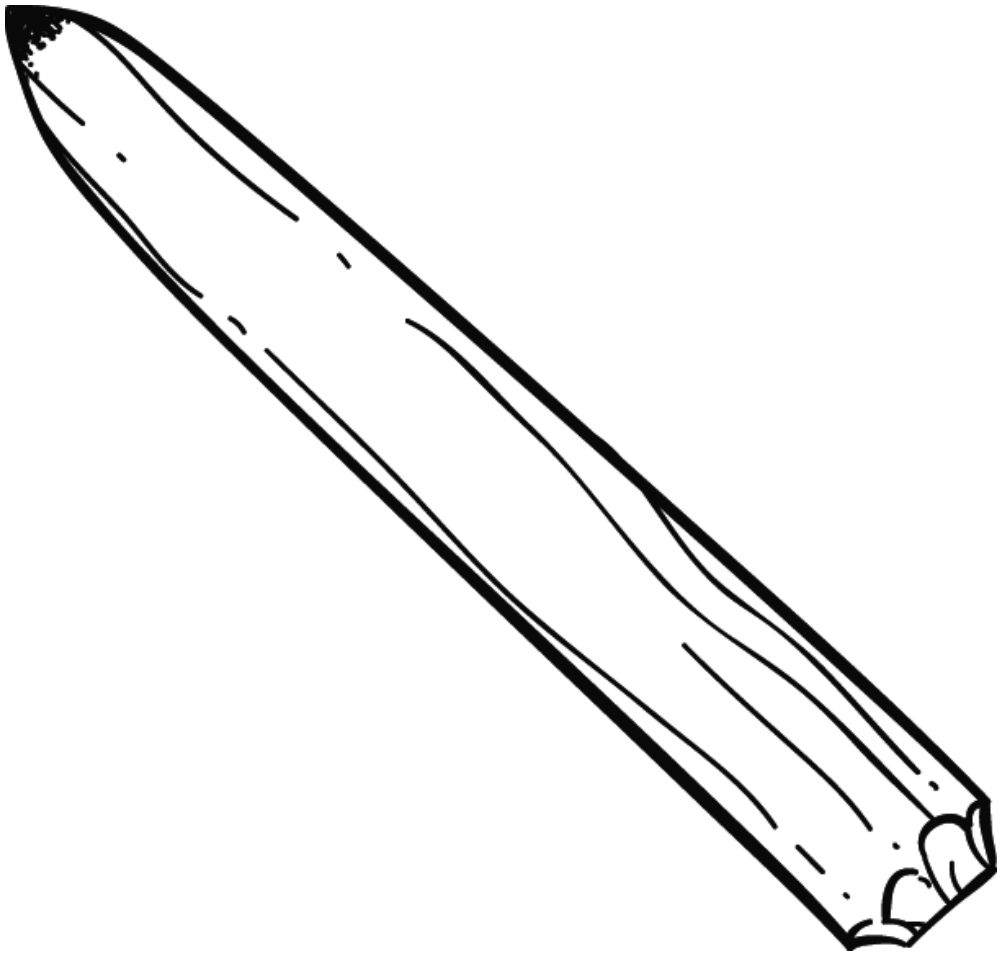

Figure 6.4 Spindle

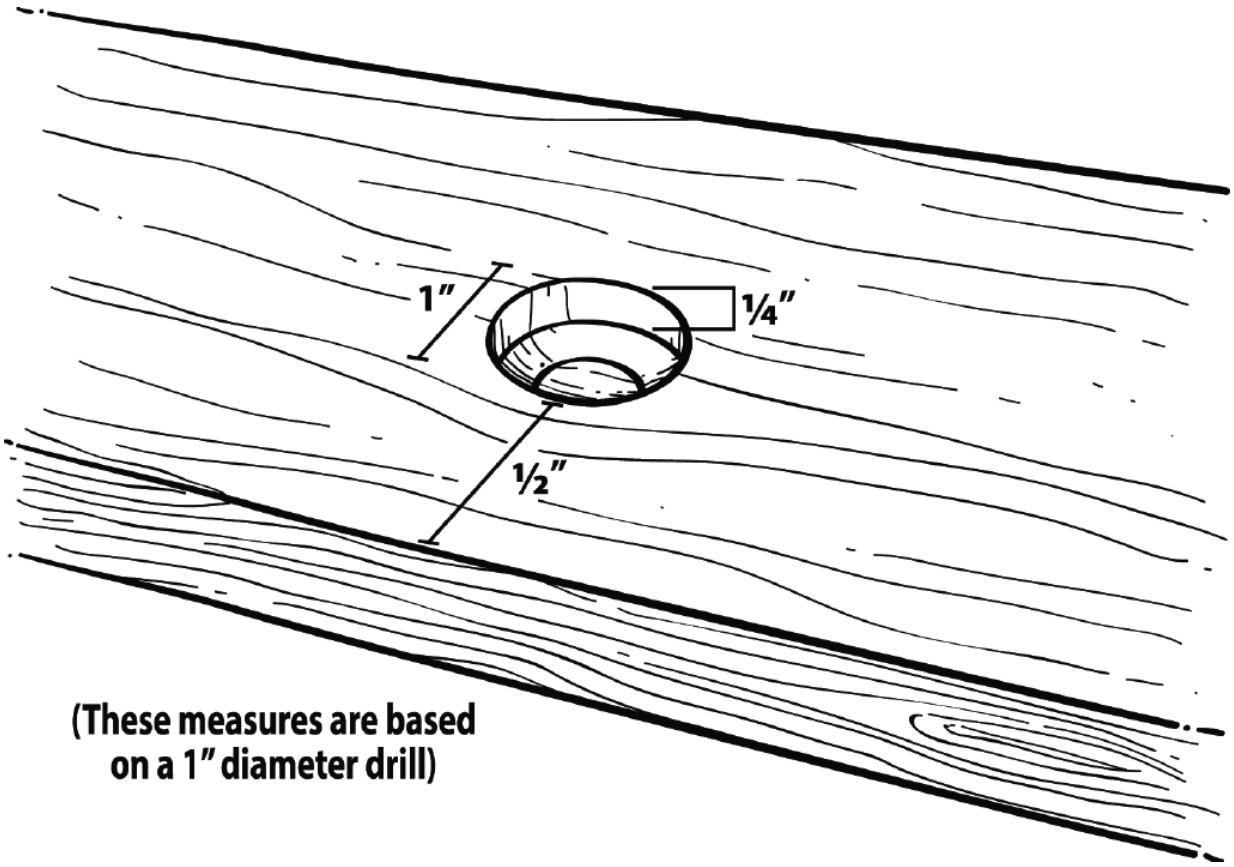

Figure 6.5 Hearth board

The bearing block should be made from the hardest wood available. Hickory and beech are good selections. Choose a green sapling if one is available, about 3" diameter. Cut a chunk 4–5" in length, then split ⅓ off of one side with your knife.

See Figure 6.6 for an example of a bearing block.

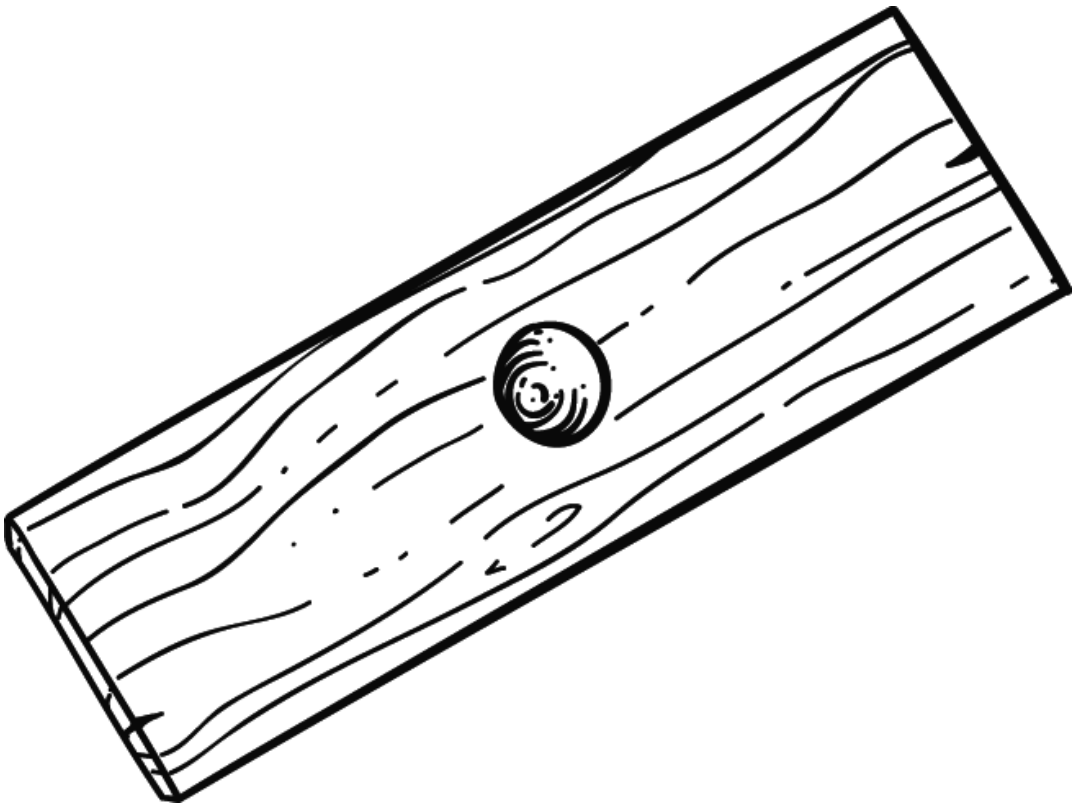

Figure 6.6 Bearing block

As to the bow, this can be made from any branch and does not have to even be bent like a bow. It just needs to be fairly stiff so as not to bend or break under strain and should be about ½" diameter by 3' long. The longer the bow is, the fewer strokes it takes to make revolutions of the spindle. A mistake I see a lot is using a bow well under 3'. To create the bow is as simple as tying a string to a branch. I have found a fork on one end of the stick and a loop works best with a simple stake notch on the other end to tie it off with a straight lashing and a clove hitch. The string need not be so tight that the bow must bend to load the spindle but cannot be so loose that the drill slips under downward pressure either. See Figure 6.7 for an example of the bow.

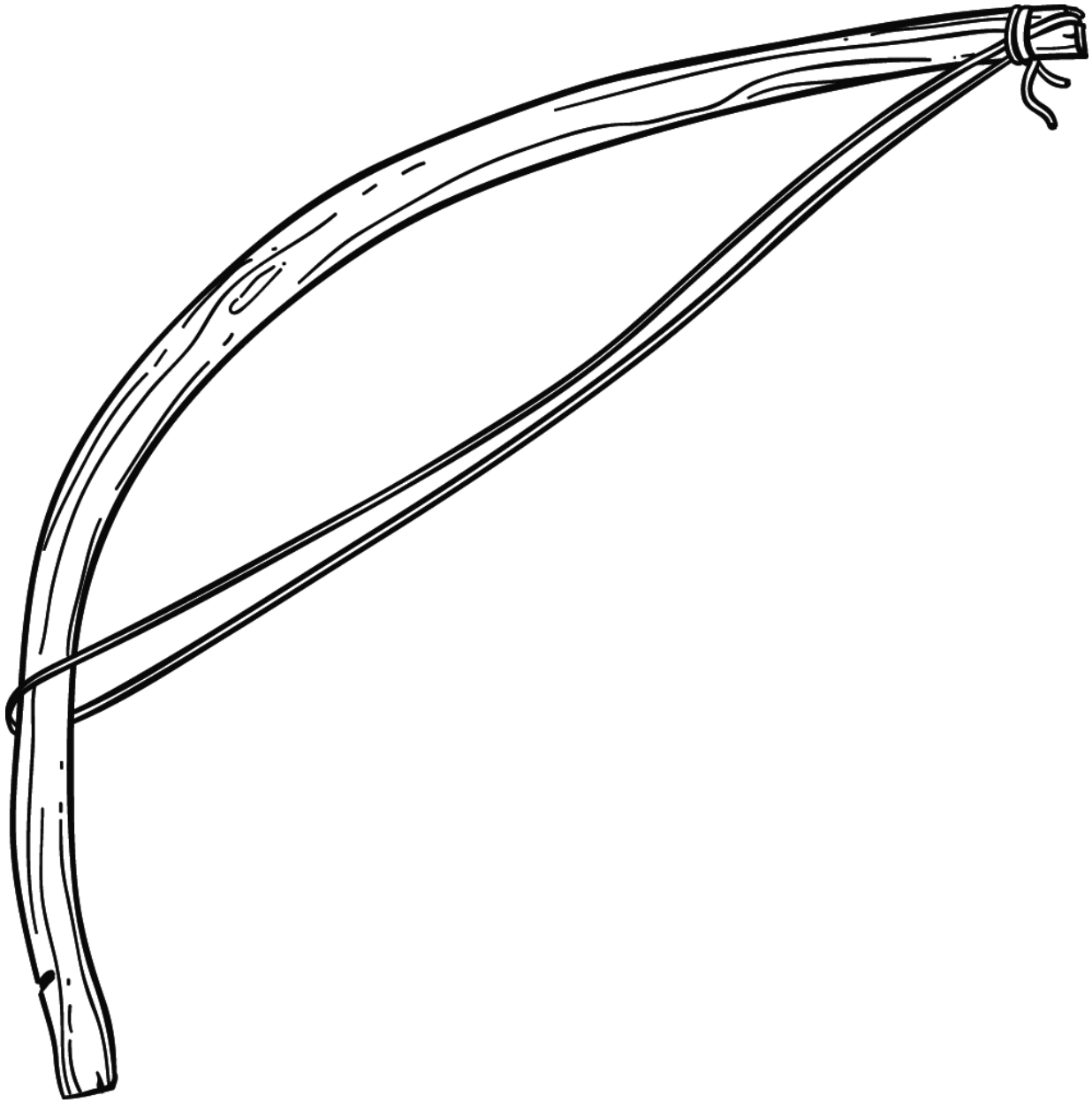

Figure 6.7 Bow

The bird’s nest must be made up of coarse, medium, and fine materials. The true beauty of this is that most of the materials good for making the hearth and spindle will also provide the materials for a bird’s nest. The inner bark of the poplar, bark from the cedar, or inner bark of the willow are all great candidates for this. There are lots of other items that can be used within the bird’s nest, such as shredded birch barks, small dead pine needles, and other things with a natural accelerant or highly combustible oils, which will aid after the flame is created.

Do not use too much dry grass or leaves, as these items burn quickly and the bird's nest must have longevity when burning to ignite the rest of the fire lay materials. Processing is the name of the game when constructing the bird's nest. Shred barks to obtain lots of the finest materials you can. Always put out something to catch the droppings as you process the material, as many times the finest material will drop to the ground. The back of your knife can do much of the work if the material is still attached to the branch or the tree when you are collecting it. If these materials are wet when being collected, process them immediately, as the more surface area you create the faster it will dry. See Figure 6.8 for an example of a bird's nest.

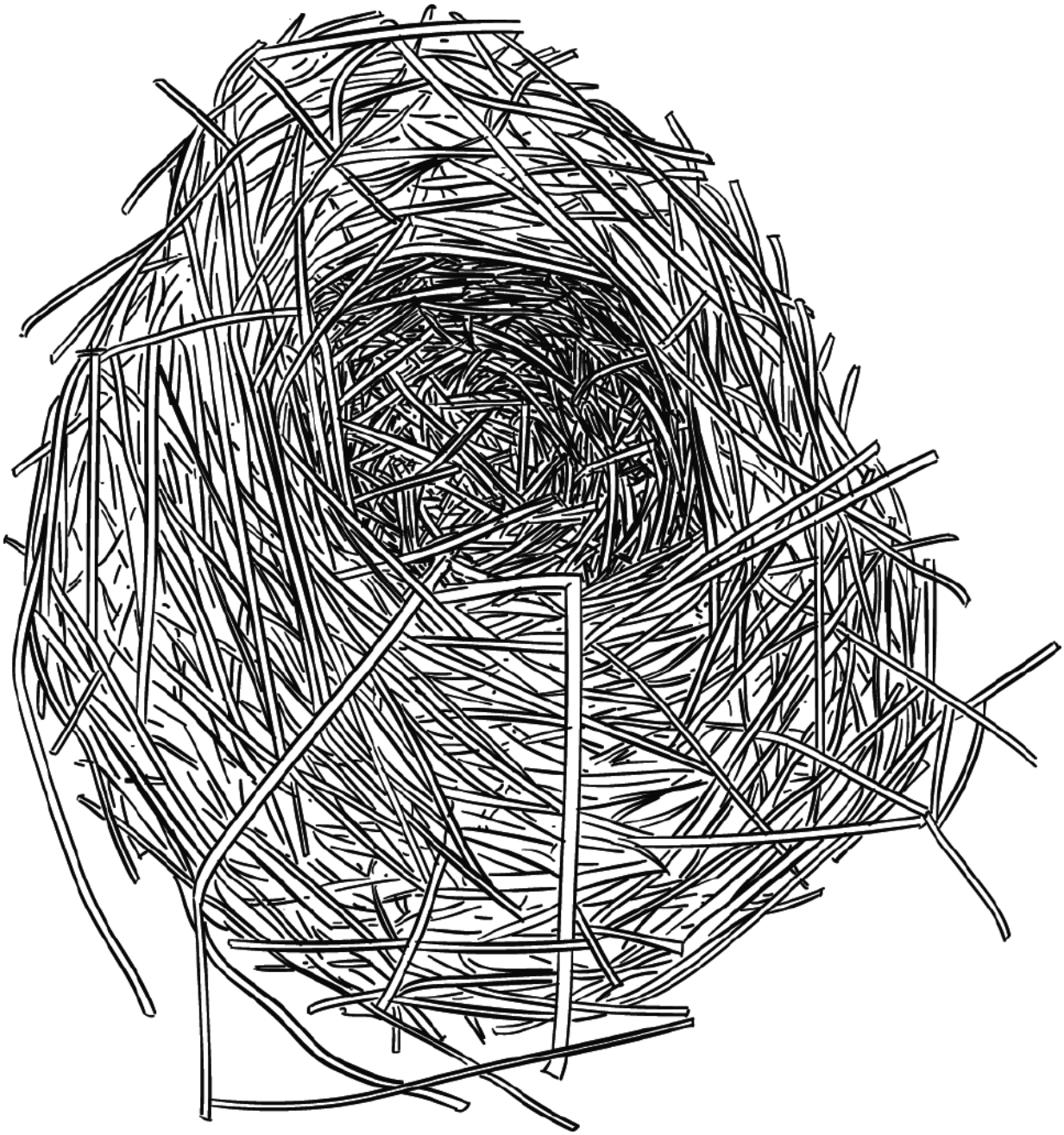

Figure 6.8: Bird’s nest

If the sun is shining, place the materials in the sun, spread out as much as possible on a dark surface such as a tarp. Once these materials are dry they can be fashioned to look like a bird’s nest—and that is exactly how it should look. You should take a look at old bird’s nests when possible to see how they are constructed. They will have finer material in the middle or center and progressively coarser materials to the outside.

To prep the spindle for use, make it as straight and round as possible. The back of your knife can finely shave small materials to achieve this if an area of the spindle is slightly bent

or crooked. Once it is straight and round, prepare the ends for use. One end of the drill should look like a worn eraser on a pencil, slightly rounded but still flat. This end will be on the hearth board to create maximum surface area and friction. This is where you want all the friction to be between the spindle and the hearth. The top of the spindle or drill needs to be shaped like the lead side of a pencil that needs sharpening: slightly dull yet still somewhat pointed. You want as little friction as possible on the top of the spindle, as this will make it easier to push and pull the bow; keep the friction on the bottom, where it belongs.

The bearing block is a key part of the set and probably the least understood, as it causes the most problems for many people. Using a hardwood for this is critical if you are making a set completely from the landscape. Softwood will immediately begin to wear away, causing the spindle to rub the wrong way. This is called “shouldering out,” and it is the biggest failure point for beginners who do not realize why they are getting worn out from operating the set and why they cannot get the set to run smoothly or get enough pressure down on the spindle.

Putting the Kit Together

Using your knife, create a small divot in the middle of the bearing block on the flat side. It only needs to be large enough to accept the point of the spindle. A free-spinning drill will be smooth and easy to operate. If you are having problems, this is the first place to look.

Then load the spindle onto the bowstring. When the spindle is loaded it should be on the outside of the string so that no friction occurs within the bow itself.

Create a small divot just off center of the hearth to accept the spindle. Do not make this divot very deep, as you don’t want to waste material you will need to form a coal. It only needs to guide the spindle during the burn-in process.

After loading the spindle to the bow, burn an area of the hearth board to guide you in notch construction. A proper notch should be a V cut in which the bottom of the V goes approximately ⅛" into the burned area. The angles of the V should be between 30° and 45°, approximately. This notch is very important in forming the coal. It gives the dust an area to accumulate from the drilling process and keeps it confined, which helps the material gather heat and lets in just enough oxygen to make it smolder as an ember if the rest of the process is performed correctly.

Place the spindle on the divot. If possible you always want the notch to the front of the board facing away from you. This will allow you to easily view the process when operating the drill. Begin to apply enough downward pressure to hold the drill in the divot as you slowly rotate the spindle. This is important as it will marry the drill to the divot for when you

begin to create the coal. You don’t need speed at this point; downward pressure will create enough friction to begin burning the wood if you use the entire bow with steady strokes.

Once the wood has burned around the spindle and things are running smooth you need to stop, as again any waste of material now reduces what you have to make a coal later. When making the notch or the area that the coal will form, take care. You do not want it too narrow, as this will clog up as well as limit oxygen to the ember. Yet it cannot be too big, as the oxygen must be properly controlled and the dust somewhat compact.

Inspect all components now before beginning to attempt a coal. Check the bowstring for stretch and retighten if necessary. Check your bearing block to make sure the divot is not getting deep and the spindle has not begun to shoulder out. Deal with these issues now, or they will only get worse.

After this you are ready to begin making fire with sticks! Okay, you need one little extra item that makes things much easier in the end and may save a good coal from going out due to ground moisture. You need to make a welcome mat that your coal is going to flow onto from the notch. This can be a small sliver of bark or a thin piece of wood, but it should be two times as wide as the notch and goes under the hearth board to catch the coal.

Creating the Coal

Assume the proper position: bent over on one knee, with the front foot on the hearth board close to the spindle but not touching and causing friction. The other leg should have the knee resting comfortably on the ground parallel to your body but tucked inside enough not to interfere with the bow moving forward and back during the drilling process.

Make sure the crook of your wrist is locked into your shin so that the spindle will not move side to side. Make sure there are no obstructions that will interfere with the full movement of the bow. Lean forward to put steady downward pressure on the spindle with the bearing block. You should have your chest over your knee at this point and easily be able to observe the activity in the notch. Begin to operate the bow again slowly at first to maintain a rhythm. You don’t need speed yet; you want steady, long strokes and downward pressure using the entire length of the bow.

The goal at this point is to remove material from the board and the drill and fill the notch with a dark brown fluffy material. Many folks make the mistake of trying to go too fast, assuming speed will make an ember, but if there is no dust in the notch you have no fuel to create the ember.

After several strokes you will see some smoke and the notch should begin to fill with material. Once that material begins to spill forward in front of the notch you can increase the

cadence of your bow strokes, going 2–3 times faster. It should only take about 10–12 full strokes of the bow at this point to create a burning coal.

When you stop, don't do it suddenly and with a jerk as this may disturb the coal you created. Instead, slow down during the last couple of strokes and stop in the same position you started. Slowly remove the spindle and bow and observe the coal. If it seems to be smoking outside the board where the dust has gathered, you are probably home free. Don't get excited, as you have a lot of time to turn the ember into a fire—about 5 minutes or more in reality. You can slowly lift the board at an angle and tap it gently with the spindle to dislodge any material that may be clogged in the notch. If the coal is still smoking at this point, you can sit back and relax for a minute, catch a few breaths, and smile!

Turning the Coal Into Fire

Now comes the most important part of the operation. Bring the bird's nest to the coal (never the other way around). Tilt the nest toward the welcome mat and pick up the welcome mat, moving it to the nest. Slowly tap the welcome mat to dump the coal into the nest. This should be a tiny drop—about a ¼" at most.

Slightly fold the nest and begin to add some oxygen by breathing into it slightly—not hard blows, just light breaths. If the coal is still burning strong you can raise the nest, slightly tilted, so that you are blowing up into it and the heat rises into the bulk of the nest. As the ember grows, smoke will begin to roll from the back side of the nest. This is the cue for you to blow a bit harder. As the smoke thickens you can increase the oxygen until it begins to burn.

Once the nest flames, turn it over so the flames are on the bottom and heat rises to the non-burning material. Place it into your fire lay and make fire!

Flint-and-Steel Method

Why is this an important method for us to understand? For the same reason the bow-and-drill method is important, in case we would lose the majority of our gear. We do not want to make two bow-and-drill fires if we can help it, so we make charred material as soon as we have the first fire. Then a flint-and-steel fire can be made the next time round.

Charred material will only require a simple spark to ignite into an ember. It can be ignited from many possible sources, but the flint-and-steel method is the number one best way if open flame devices are unavailable. As long as we do not lose our primary cutting tool, we should be able to find a rock to serve as the flint.

To effect this method you will need to drive small shards of iron material from the back of your knife with a rock. These particles will combust with friction and oxygen at 800ºF. It may take some searching for a rock that will do this but any flint, chert, or quartz rock will work if you can break or find a sharp edge. See Figure 6.9 for an example of a flint-and-steel kit.

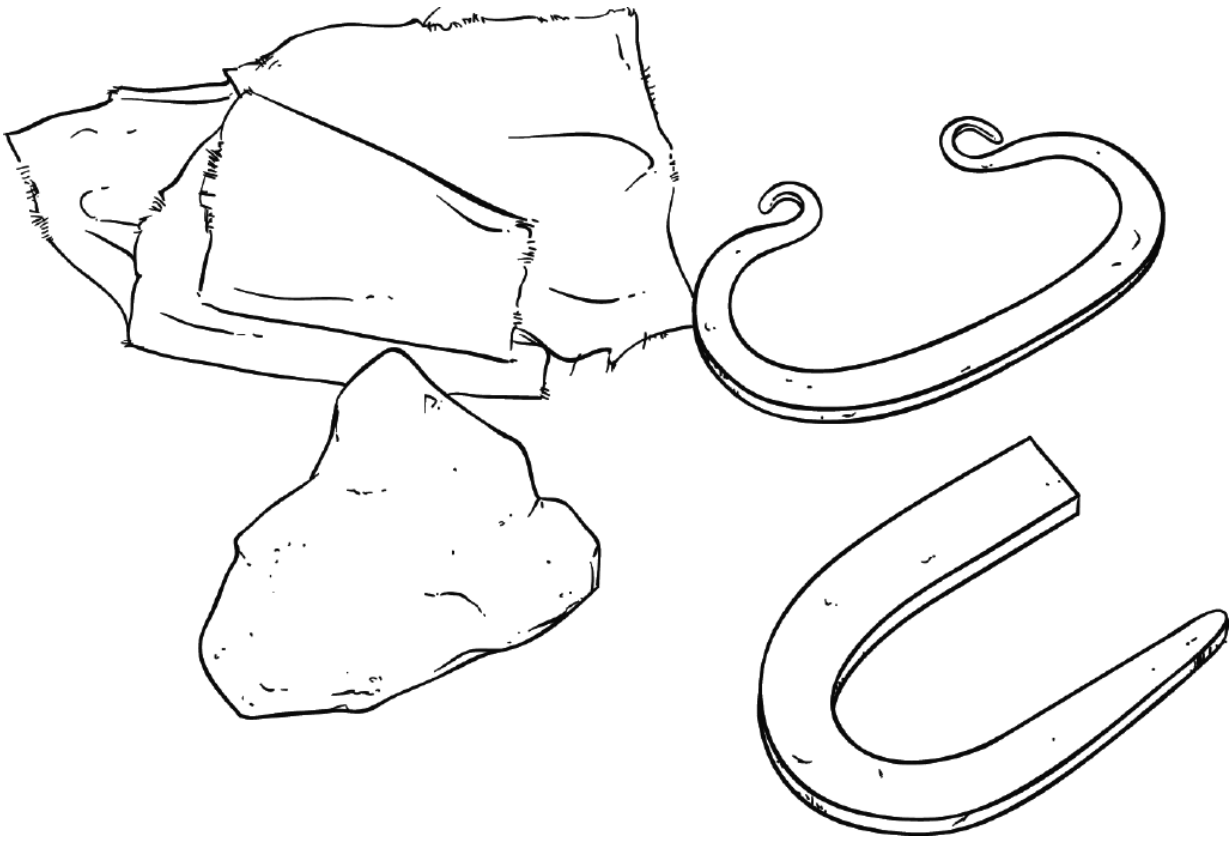

Figure 6.9 Flint-and-steel kit

Material for Flint-and-Steel Ignition

Some fungi like chaga (true tinder fungus) will take the spark from this method without charring first. You can also get the dust from some types of shelf fungus (*Fomes fomentarius*) to take a spark. To accomplish this you'll need to create a small pile of dust with a saw cut or by scraping with the back of a knife. Once the dust has ignited it must be left to grow into a coal, whereas the true tinder fungus can be ignited within a larger piece and the dust is not necessary. With either of these materials you want the softer inner materials, not the outer hard surface.

You can also elect to char material, which is a much better guarantee that a spark will give you ignition. This material can be made from many things from the landscape, including

punky decaying wood and the inner pith from some plants like mullein. You can also use materials that are 100 percent cotton, such as from clothing or kit.

Making Char

To make charred material of any kind means you will need to severely limit the oxygen to a material that is contained and superheated. The easiest way to do this is to use some type of metal chamber with a way for gases to escape as it heats up the material inside.

A stainless steel bottle and nesting cup will work for this, as will an old can with a flat rock as a lid. Place the material to be charred inside the chamber and place the chamber into the fire. Coals are better for this than direct flame, but either will work.

As the material is heated in the chamber, gas that looks like smoke will begin to escape from any place that is not completely sealed. This is okay as long as oxygen cannot enter. Once the smoke stops the charring should be complete. It is very important to wait until the chamber is completely cool before opening the container, as the addition of oxygen to hot material will make it burn.

Once the container is cool, inspect the contents. If it is black and frail looking, it is most likely correct. If it is brown, it can be put back into the fire the same way without harm. It is easy enough to test a small amount of the material to make sure it is correct. Many woodsmen will carry a specific tin for fire material and charring called a char tin. Altoids breath mint–type tins or old shoe polish cans work well for this.

If you are using this type of system, sparks can be struck from the metal tool directly into the tin, so that the surface area to catch an ember is increased. Once an ember is created it will need to be placed into a bird’s nest as described in the previous section on the bow-and-drill method.

Advantages of Char

There are many advantages to charring material. Making a highly combustible material that can be added to marginal materials within a bird’s nest allows extended heat sources for effecting ignition. Charred material can be ignited with almost any spark, from old lighters to ferrocerium rods to a sun glass. This variety of ignition methods makes char a perfect material to keep in good supply within your kit.

Solar Fire

There is a huge advantage to using a sun glass to create an ember: The sun is a renewable resource, and you are expending no resource from your kit to make this ember. All materials for ember-making can be collected from the wild and are not difficult to use.

Remember the discussion on adding a burning ember to a bird’s nest? This will not change, nor will the construction of the nest itself. Any charred material can be ignited by the sun glass, as can both of the fungus species we have discussed. Horse hoof fungus may work better as a dust but it will make a nice coal in a short amount of time. You can also create an ember by compressing natural materials like cattail down or poplar bark into a tight small ball about ¼" in diameter, then using the glass to burn into the material, creating a smoldering ember.

Tips and Tricks

- You should always be thinking of the next fire. If you use up your emergency fuel source, what will you do for the next fire? That’s why I suggest making char as a priority from the first fire.
- Remember, campfire cooking is done over coals, not flame. Cooking over a flame will char the outside of your food while leaving the inside cold. Cook over the coals for better results for most meals.
- While you’re eating, put a pot of water on the fire so that water will be hot for cleanup.
- Cover pots when cooking. This helps meals cook faster and keeps insects from getting too curious.
- Be patient. Since you’ll do most of your cooking over coals, not open flame, you have to wait for the fire to die down. It will also take longer to cook a meal over a fire than in an oven or on a stove.
- Keep an eye out. Most foods cooked over a fire will need your attention from time to time. You’ll need to stir it often and move it to different parts of the fire (or move hotter coals underneath your pot) in order to cook evenly and thoroughly. A fire is not like an oven or a stove; the heat will not be evenly distributed.

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Chapter 7

Tools and Utensils

"Real freedom lies in wildness, not in civilization."

—Charles Lindbergh

Cooking requires equipment—everything from knives to cut meat to pots to cook it in to plates to serve it on. But to carry all that equipment would take up a lot of room and a lot of weight. In this chapter, we'll talk about what equipment you really need, how you can lighten your load, and what tools and utensils you can actually make from materials in your environment.

Almost any tool you could possibly need for processing and cooking food can be made from the landscape in a pinch for sure. However, the most difficult to make—especially depending on local resources and skill level—are cutting tools and containers. Peripheral items, from cutting boards to spoons and spatulas, are easy enough to improvise if you need to.

Cooking Equipment Materials

Before we get into actually choosing and using containers, we should discuss material types a bit to have a better understanding of the pros and cons depending on the situation and the way we are using it. Obviously we can fashion utensils from natural materials and improvise cookware from cans, which we'll describe later in this chapter. But for this discussion, let's start off with talking of dedicated containers we may carry for cooking that are bought new or used and the types of materials they are made from.

We will not speak to cooking with tin and copper in this book although for re-enactment purposes they are a viable option. However, brass buckets make a good addition if you can’t afford the heavy stainless steel kind. Brass buckets can often be found at estate sales and antique malls at reasonable prices.

Cast Iron

The biggest advantage to cast iron is even heating. It takes time to heat this material but it retains heat well and cooks food evenly due to this property. Cold spots caused by a sudden change in wind direction will be rare if ever. Lots of great cookware is made from cast iron, from ovens to pans, griddles, and biscuit and bread pans.

One of things most often carried in westward expansion where wagons were available was the family's cast iron, especially the Dutch oven. Because these come in many sizes from 1 quart to as large as 14" across, they can be fitted well to your needs and form of conveyances.

The biggest downside from a traveling standpoint is weight. Cast iron also requires a certain amount of care for it to maintain its seasoning and keep food from sticking.

Sheet Steel

Sheet steel, both thick and thin, has been used for making cookware since as long as it has been available. Steel is generally lighter than cast iron but still heavy unless the gauge is thin. Many nice old cold-handle skillets are available; they make great camp cooking tools that weigh very little compared to cast iron and will season much like cast iron, since they’re made of a porous metal. Rust is the main enemy of this material (much like cast iron) so some care must be taken to maintain it.

Enamelware

Enameled cookware came to the U.S. around 1850. Americans began to own enamel-lined culinary utensils, but they were very plain—nothing like the colourful mottled surfaces that were yet to come. The Stuart & Peterson foundry in Philadelphia was making enamel-lined cast-iron pots in the 1860s.

Enamelware is an iconic part of camp cooking, and it is still as viable an option today as it was in the late nineteenth and early twentieth centuries. It is lightweight, easy to clean, transfers heat well, and has few drawbacks. The main issue is the chipping that occurs from abuse. But drinking vessels from this material are hard to beat for a good cup of morning coffee. It can be found in good condition, is cheap enough, and will last a lifetime if cared for.

Stainless Steel

An improvement over carbon steel in both strength and rust resistance, stainless is by far one of my personal favorites for camp cookware. It will never cook as well as cast iron in my opinion, but the tradeoff in terms of weight and maintenance alone gives it high marks for use over time and seasons.

It transfers heat fairly well, although not as well as cast iron. While camping I often use sand straight from the creek bed to scrub my stainless steel, and it is none the worse for wear. Stainless steel is getting less and less expensive, so it is generally very affordable. There are very fancy pieces on the market that combine stainless steel with copper or aluminum bottoms for better heat transfer but these are not necessary for simple camp meals.

Aluminum

Let me first say that until I see conclusive research that cooking in aluminum has major issues on health I will continue to use it. However, each person should make his or her own judgments about this material. It has so many advantages from a weight and cost standpoint it is hard to ignore. Hundreds of thousands of Boy and Girl Scouts have cooked with aluminum cook sets for the past 80-plus years; these sets are readily available and cheap to buy.

Aluminum has fantastic conductivity and is very durable and lightweight. Modern anodized aluminum takes away the concerns of health risks, is inexpensive to buy, and gives a helpful nonstick surface to cook on as well. The only issue is from scratching, as with most other nonstick coatings.

There are even Dutch ovens made from aluminum that are a third the weight of cast iron. Aluminum transfers heat very well, so coffee cups of this material make drinking hot coffee a dangerous game.

Titanium

Titanium is the latest and greatest material for camp cookware, but is it the best? In my opinion this fantastic metal, used for making the lightest of modern cookware, is a great resource. If you are counting every ounce in the pack, that is where the advantages begin and end for me. The drawbacks are that titanium is very expensive, tends to warp in the direct heat of a campfire, and it does not cook evenly at all. Like aluminum, it’s a good heat conductor so it heats too fast and cools too fast for cooking.

For simply cooking, like preparing a prepackaged mix with water meal, and combined with a fuel-based camp stove, they have their place for sure, but for actual camping and bushcraft, I feel the expense far outweighs the usefulness.

Basic Equipment

Let’s first discuss the minimum equipment you need and how you can make one item serve several purposes. A water bottle and nesting cup of metal will prepare a lot of food for one person, and a good belt knife will help with processing both food and fire fuels. Some water bottles that have cups also come with a lid for the cup and have been further developed to allow the cup to be suspended by a makeshift bail, becoming a small pot.

You can use a flattened stick to stir anything in a simple one-pot meal and a forked green stick will suffice for a fork. If you don’t want to improvise a utensil, you can carry a spoon easy enough. If you want to carry a fork as well, this takes little room and there are plenty of combination spoon/fork utensils on the market. With this minimal kit, you can make any of the one-pot recipes in this book by adjusting ingredient levels, or you can easily prepare a few packaged foods into several different meals. For traveling light and a single person on the trail, this kit is hard to beat for a weekend outing. See Figure 7.1 for an example of a bottle kit with nesting cup that can be used as a bush pot.

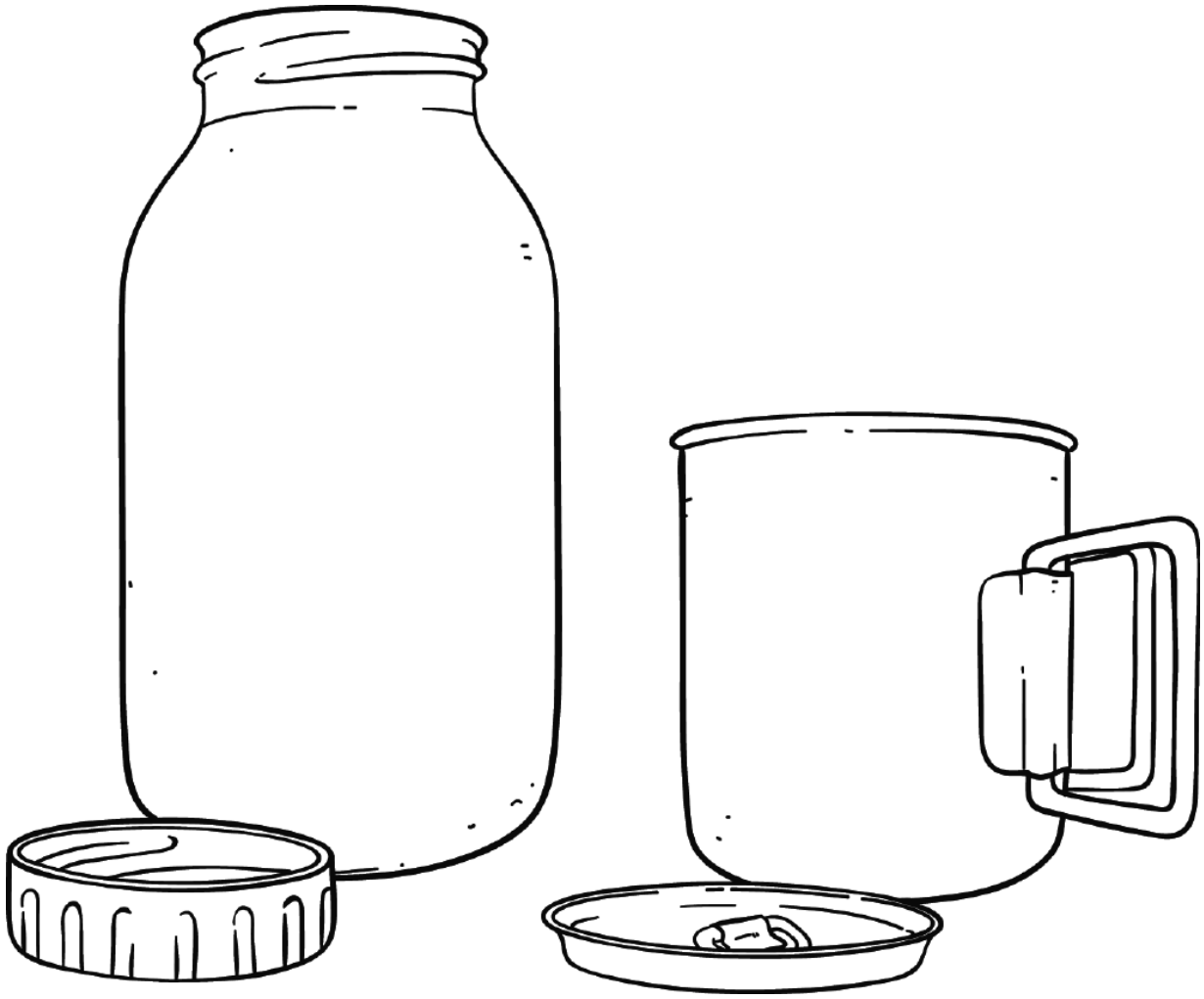

Figure 7.1 Bottle kit

For a longer stay or if you have an extra person along, a communal pot that's a bit larger will come in handy—for heating water if nothing else. Something in the 2-quart range is good. This can be a commercial bush-type pot with lid and a bail handle that allows it to be hung over the coals. A simple stainless milking bucket will also work well—milking buckets also have bail handles but no lids.

Bushcraft Tip

To me the best folding cook sets are always the plain BSA aluminum sets with the handle that holds the unit together and a wingnut that secures it.

Single-Pot Cooking

Single-pot cooking has been very popular for a long time both from an ease of cleanup and prep standpoint, but also from the necessity of only carrying one container for cooking when trail hiking, camping, or trekking. The one pot can range from a simple #10 can and a bailing wire bail (handle) to a bucket of some sort or even a readymade bush pot or small cylindrical coffeepot. Any of these apparatus will work, giving you many advantages. A larger pot can make it easier to carry water to camp, boil that water for disinfection, and cook anything from coffee or tea to simple one-pot meals that can be adapted from almost any foods available.

Two-Pot Alternative

Single-container cooking can also be done in a pan or skillet but to carry these without the pot is a bit counterintuitive to be honest as it negates the larger capacity for boiling water in camp. However combining the two (pot and skillet) gives you a fantastic variety of meals that you can accomplish, and if the pan nests somehow to create a lid you have a further advantage.

The Dutch Oven

The most famous of the one-pot meal makers is the Dutch oven, and these prized items, passed on from generation to generation, are the king of camp cooking. There is nothing you can make on the stove or in the oven at home that cannot be accomplished with a good Dutch oven.

If you are unfamiliar with it, a Dutch oven is a cast-iron pot with a lid and usually a bail. The originals had no legs nor did they have a recessed lit but more often had a domed lid and were used for cooking at the hearth for most baking needs.

Later in the Colonial period, the new style of Dutch oven with legs was created. We often call it the camp Dutch oven. The legs make placing coals under the pot easier. You can place cooking coals on top of the lid for more even cooking and baking.

Picking Up a New or Used Dutch Oven

Finding a new Dutch oven is an easy enough task. Brands like Lodge have been making them in the U.S. since 1896. There are also many good brands of antique ovens from Wagner to Griswold, but many of these can be costly investments depending on rarity and size or type. My recommendation would be to buy a new one, as the investment is smaller until you find the style and size you like best. Once you have determined your preference, you can often find the more expensive versions at flea markets and sales and sometimes find a great deal on them as well.

Things to look out for are pits from rusting. Surface rust is easy to fix, but pits in the material are another story. When buying new, check to be sure the surfaces are smooth, especially on the inside, and there are no foundry blemishes. Check for even wall thickness throughout the sides of the pot as well as the lid rim if you are buying a camp-style oven.

If it has legs, ensure that these are not hollow legs that will gather dirt inside and eventually rust. Make sure it has a good, heavy bail and that the lid is a good fit. It should rotate easily on the oven but not have enough side-to-side movement that a gap can be seen.

Pros and Cons of Additional Cooking Equipment

The main thing to remember is that all cooking gear is added weight, and that weight could be taken up by foodstuffs to prepare in case the hunting, fishing, or trapping does not go as planned. The more we can improvise, the better and the more compact the kit.

Skillets

Skillets are not a necessity unless you plan to fry or brown meat possibly to add to a larger dish like a stew or casserole. Even then, meat can be browned quickly on a stick if need be (as long as it is not ground meat). Skillets do however come in very handy in a longer-term setup or when more folks are present and you plan to make fry breads or some type of fried grain meal like mush.

Now with all of that said, you can easily improvise a skillet or shallow pan from a stainless steel dish such as a dog bowl. It will fit well inside a bucket or pot, using pliers for a handle.

Some would say that it’s easy enough to carry a skillet with a folding handle so it doesn’t take up much room but it’s all relative: A solid handle is likely to be more stable and so a better choice if you plan to carry a skillet at all. Again this comes down to an easy equation of weight versus rate. How much is carrying that weight going to do for me in the end and can I get by with something else to do the job like pliers and a dog bowl?

In the end, available conveyance will weigh heavily in decisions of this type. It makes no sense to pack a skillet unless you plan to use it and can afford the weight on your back.

Reflector Oven

One thing that you may consider worth the weight especially if traveling in a group is a reflector oven. These can be purchased or made from pie pans and are a great device that packs flat, weighs little, and is great for cooking anything from biscuits and breads to cookies and other desserts.

The basis of the reflector oven is just that it is used close to a burning fire to reflect heat from under and at the same time above a cook surface to provide even baking heat. These are ideal if you want some camp luxury. See Figure 7.2 for an example of a reflector oven in use.

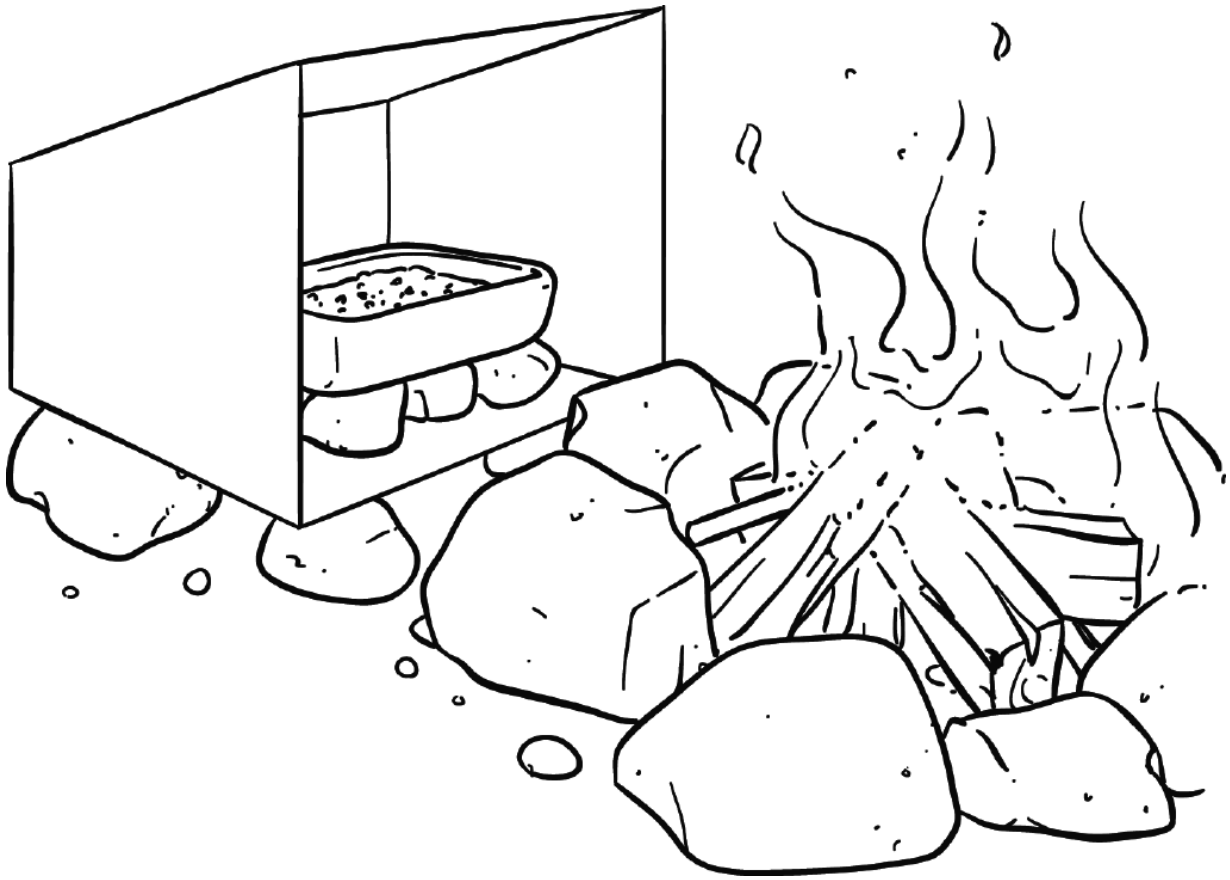

Figure 7.2 Reflector oven

Earth Ovens

Also called rock or pit ovens, earth ovens are a simple way to cook food and have been around for thousands of years. Basically you dig a pit in the ground, lay a fire, place stones around it, then light the fire and let it burn to coals. The stones will absorb and radiate heat, so food placed in the pit will cook. Figure 7.3 shows an earth oven.

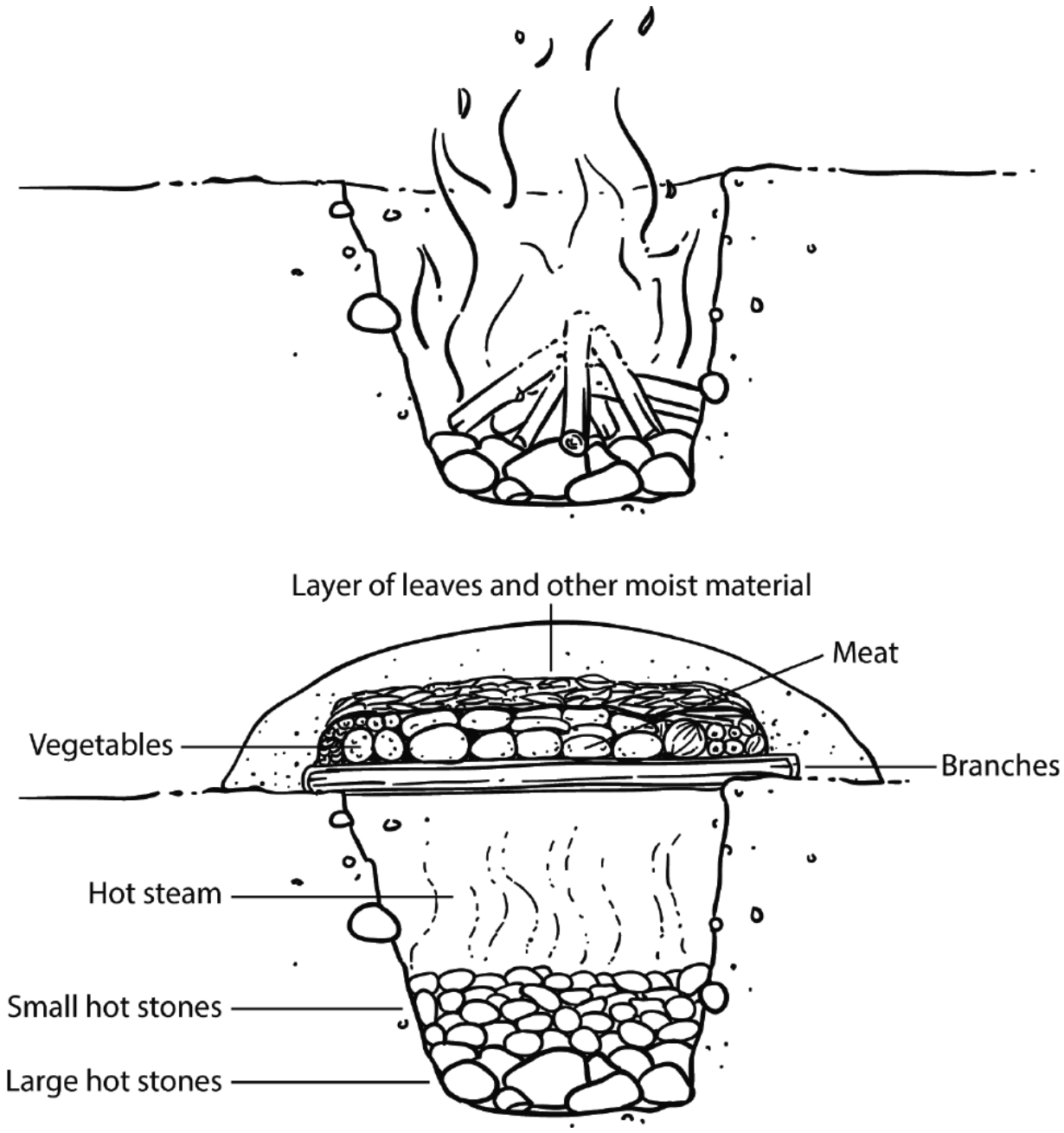

Figure 7.3 Earth oven

Carrying In Utensils

If you plan to carry utensils in, they should be a match for the cookware you have. No, I don’t mean like matching clothes; I mean a

match to the material of the cook set for better results and less damage to patina and seasoning.

If you are using cast-iron or steel pots and pans, they will have a coating called a seasoning. If you use a metal utensil on this surface you chance removing and or scratching this causing food to stick. The same is true with nonstick pots and pans—the nonstick coating can easily be scratched. However, this is not a worry with stainless steel and aluminum pots and pans. Although aluminum will become scratched from steel utensils, softer metals won't hurt it. It is really common sense; you don't want a utensil harder than the cook surface, so match them to what's in your kit.

Care for Cookware

To make your tools and utensils last longer, you have to take care of them. Here are my best tips for keeping your cookware in good shape.

Wooden Utensils and Implements

Wash clean using a very light abrasive (such as the rough scrubbing side of a sponge) if needed. Dry with a rag instead of letting them air-dry. Water left too long on wood can cause it to begin to rot. Once a month or so, rub a good coat of mineral oil into the wood with a soft cloth. This prevents the wood from drying out and splitting.

Wooden items made on the spot for use in camp that are not going to be taken out can be burned in the fire to dispose of them.

Stainless/Aluminum/Titanium Metals

These types of metal are fairly easily cared for. Wash as normal and allow to air-dry. Water used for cleaning should always be hot if possible.

When soaps are not available, boil with water in the container over the fire before the final rinsing and scrubbing. If you need to scour the surface and do not have abrasives, fine sand from the creek bed will do. Just boil and rinse after this initial cleaning and allow to air-dry.

Uncoated Sheet Steels and Cast Iron

These surfaces will be seasoned before and during use so avoid abrasives during cleanup. Scrape all remains of food from the surface with a wood scraper or a natural-material scrubbing brush. Boiling water in the container can loosen any stubborn foods left on the surface after cooking.

Once the surface is clean, wipe lightly with mineral oil on a rag. Do not let stand with water in the container for longer than a few hours if possible.

If rust appears on the surface, try to remove it without abrasives first. Implements like this that have rusted over time may require a soap-and-water scrubbing with an abrasive and re-seasoning of the surfaces for the cookware to be used again.

Clay or Fired Cookware

If these containers have a glaze, they can be treated with care as a metal container for cleanup; they should be towel dried. If they are porous surfaces and unglazed, they will need to be seasoned and treated the same way as cast iron or sheet steel.

Cooking Irons and Fire Gear

Since these implements will get lots of abuse, being left in the rain within the fire pit and then charred by fire time and again, they will deteriorate over time if left unattended. As well they’ll get everything black

with soot if you don’t clean them before storing. Between uses it does not hurt to heat them up and coat them with either a beeswax-and-turpentine mix or just paint them with a high-temperature black paint. They can be cleaned by wiping them down with a disposable rag and them oiled or waxed again to build a seasoning, or scrubbed and repainted between trips. The important thing is not to let rust build up on them over time.

Tips and Tricks

- Companies like Palco made entire cook sets with nesting pots, pans, coffeepots, plates, and cups from the early 1900s. These sets can be had very inexpensively and can be broken down depending on your personal needs.
- Remember that items with multiple uses are better to carry than items that can only be used for one thing. An oven mitt is great for touching a hot pan, but that’s all it does. A pair of thick leather gloves can serve as an oven mitt and also be used to clear brush around a campfire and other chores.
- When cleaning your cookware, liquid soaps and hot water can be used for everyday cleaning (don’t use soap on cast iron) but avoid scrubbers made from any metal or hard abrasives.
- If your cast-iron cookware is new, food may stick to it a bit until it’s seasoned. Use more oil or butter when cooking to help prevent sticking.
- To re-season cast iron, clean it thoroughly (using soap if you must), dry it completely, then coat it with cooking oil inside and out. Put it in a 400ºF oven for 1 hour (place aluminum foil in the rack beneath it to catch any dripping oil). Turn off the oven and let the pan cool down inside the oven.

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Chapter 8

Tools Improvised from the Landscape

“Learn to do common things uncommonly well; we must always keep in mind that anything that helps fill the dinner pail is valuable.”

—George Washington Carver

If you have the time, you can construct almost any kind of utensil you will need for cooking, depending on available tools and your skill level. But sometimes a stick will do as good a job as anything; we tend to overthink things quite a bit. In a real tight spot, remember God gave you ten fingers for a reason.

Cutting Boards and Planks

The same piece of wood can be used for both carving food and for some cooking chores. A cutting board or cooking plank should be cut from a green hardwood, preferably one without resin, which will impart a bad taste to the food. The wood can be split from outside the pith of the tree trunk or large limb. It should be a minimum of about 4" wide by 12" long. You can create this using only a knife if the one you carry is capable of batoning without breaking (batoning is the process of splitting a piece of wood by driving a knife through it). An axe or larger chopping blade makes this an easy task.

You want this board to be about ½" thick when finished and smooth at least on the side that will be used. The flatter it is on both sides the more enjoyable and easier it will be to use.

Cedar, hickory, and maple make the best planks. Green wood is what you want for this application.

For grilling, you want the plank damp. Soaking it for an hour or so before use will accomplish this. For baking, the plank can be dry.

Plank grilling works best if the food and plank are enclosed in an oven setup. Any oven will work for this, be it earth, Dutch (if large enough), or reflector.

For baking, the plank is used merely as a platform that can be manipulated at an angle around the fire to cook things like bannocks or fish. The plank for grilling is placed directly on the rack or the floor of the oven to maximize heat, and the evaporating moisture will help keep the meat moist as it cooks; this works great for thinner steaks and fish.

Utensils

Depending on the task, a cleanly broken stick will work for lots of things. Carving one side of a small branch, about 2–3" wide, at an angle will work fine for a spatula for batter mixing and stew stirring. No need to be fancy with this. Again, green hardwood is preferred; use something with no resins to impart taste to the food.

Tongs are simple to create—cut a green sapling and carve a thin middle section on one side, then bend the branch in half to create the pinchers or tongs.

When I think about spoons, I figure they are nothing more than a shovel and don’t need to be any fancier than that for a one-time use. Carve another 2" sapling and make a curved angular cut with your knife. Smooth

it as best you can and call it good. If you live in an area with mussel shells, using a shell as a spoon is an easy solution. You can either hold it in your hand or lash it to a split green stick.

Bushcraft Tip
Bark can make some handy tools fairly quick, from cups to spoons to ladles and simple trays for eating or for steam cooking.

Creating Nicer Wooden Utensils

The creation of beautiful wood utensils for cooking and eating is a relaxing pleasure that's hard to match, but this should not be done at the time they are needed—if it's the last minute, then you use what is around you. If you desire to create nice utensils and keep them, there is time for this in camp or before the trip but some special tools will be needed in most cases for creating a concavity or "dishing out."

A good group of wooden utensils for a modest camp would be an eating spoon about tablespoon-sized and a larger serving spoon, a spatula, and a ladle. The ladle will take a bit more skill than the others but the more you make, the better you will become.

Create utensils from green wood. Remember that softer woods like poplar are easier and faster to carve but harder woods will last longer over time. In this book we will not get too deep into this subject as it could make a complete book alone, but there are a few simple rules to remember:

1. Don't use woods that have oils or resins within them. Coniferous trees have resin and should be avoided. Birch is an excellent choice as the

oils are contained in the bark and it is a fine harder wood that carves nicely.

2. Avoid areas with knots or twisted grain.
3. Always remove the pith from the project piece.
4. The thinner you carve the piece, the less apt it is to crack while drying. This sounds counterintuitive, but wood shrinks as it dries, and the thicker it is while drying the more moisture is retained in some areas and less in others, which can cause the thick bowl of a spoon to crack as it dries.
5. Always work with the grain, not against. This will become obvious while carving, as working against the grain will remove chunks instead of fine slivers.

Start with a straight-grained branch or sapling about 4" in diameter. Cut a section about 12" long and split this in half with an axe or another tool. You will see the center pith when you split the piece. This should be removed by carving it off. You now have the blanks for two utensils, a serving spoon and a spatula. See Figure 8.1.

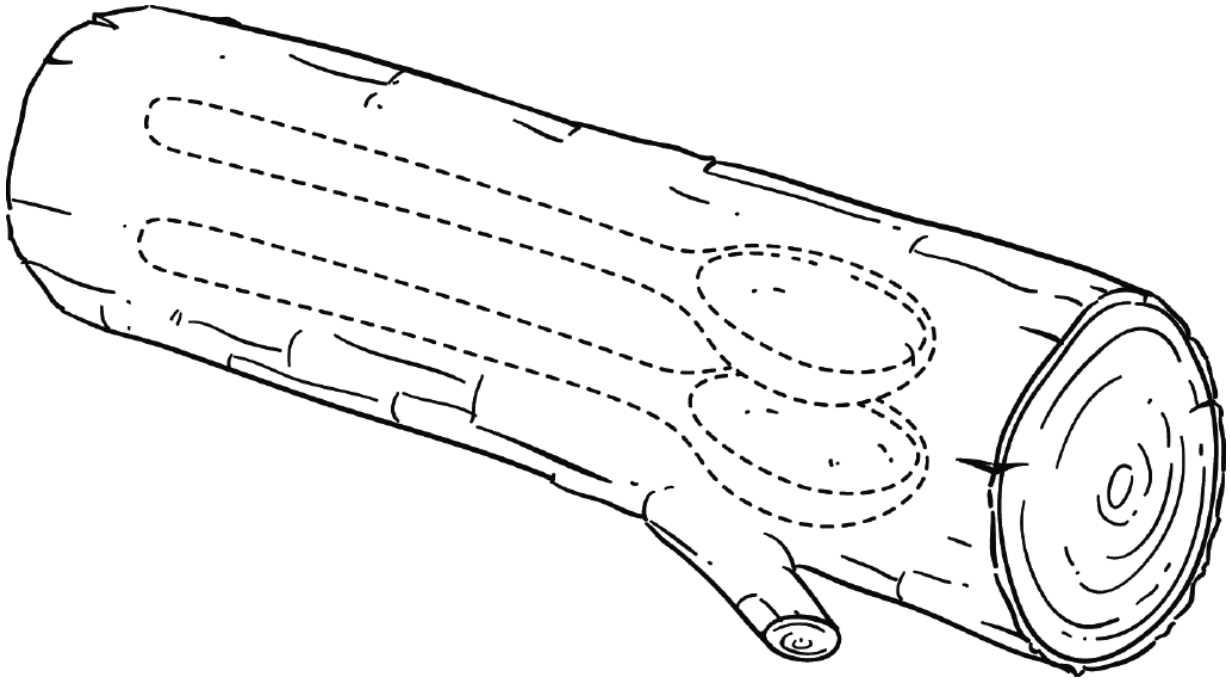

Figure 8.1 Serving spoon and spatula

For the spatula, take one side and split off a veneer about ½" thick. You now have the leftover of that side to make an eating spoon. You should get three tools from one piece of wood easy enough.

There’s no real trick in carving the basic shape for a flat spoon or for a spatula—it’s a straightforward carving process. The basic carving can be done faster with a saw or an axe than a knife. Once the rough shape is made, then you are down to fine carving.

Fashioning the bowl is the tedious part of the spoon process for the beginner, but with the right tool it goes very fast. Many would say at this point that a good spoon-carving knife or hook knife would be the tool for this, but for me the easiest to use and make short work of it is the gouge. A nice shallow sweep (or the depth of the concavity in the tool), about ¾–1" wide, will be plenty for any spoon bowl you wish to make. The same process can be used on ½ scale to make an eating spoon.

Spatulas are a bit easier with the same basic beginning steps. However, the end of the tool will be square or slightly angled and beveled over the length of the working end to make it chisel-like for getting under things in the pan. See Figure 8.2.

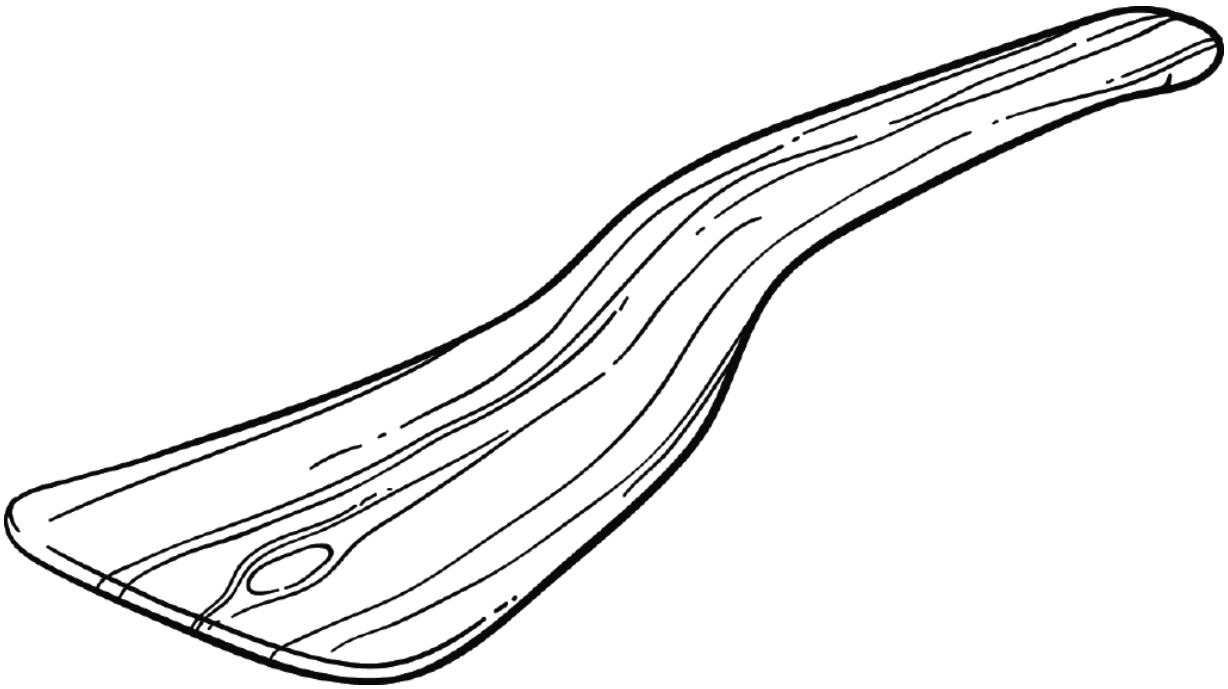

Figure 8.2 Wooden spatula

A simple whisk can be made by finding a sapling with several shoots growing from a central point. If this is cut at about 12" and the shoots cut to about 8" they can then be folded backward against the handle and lashed with cordage. See Figure 8.3.

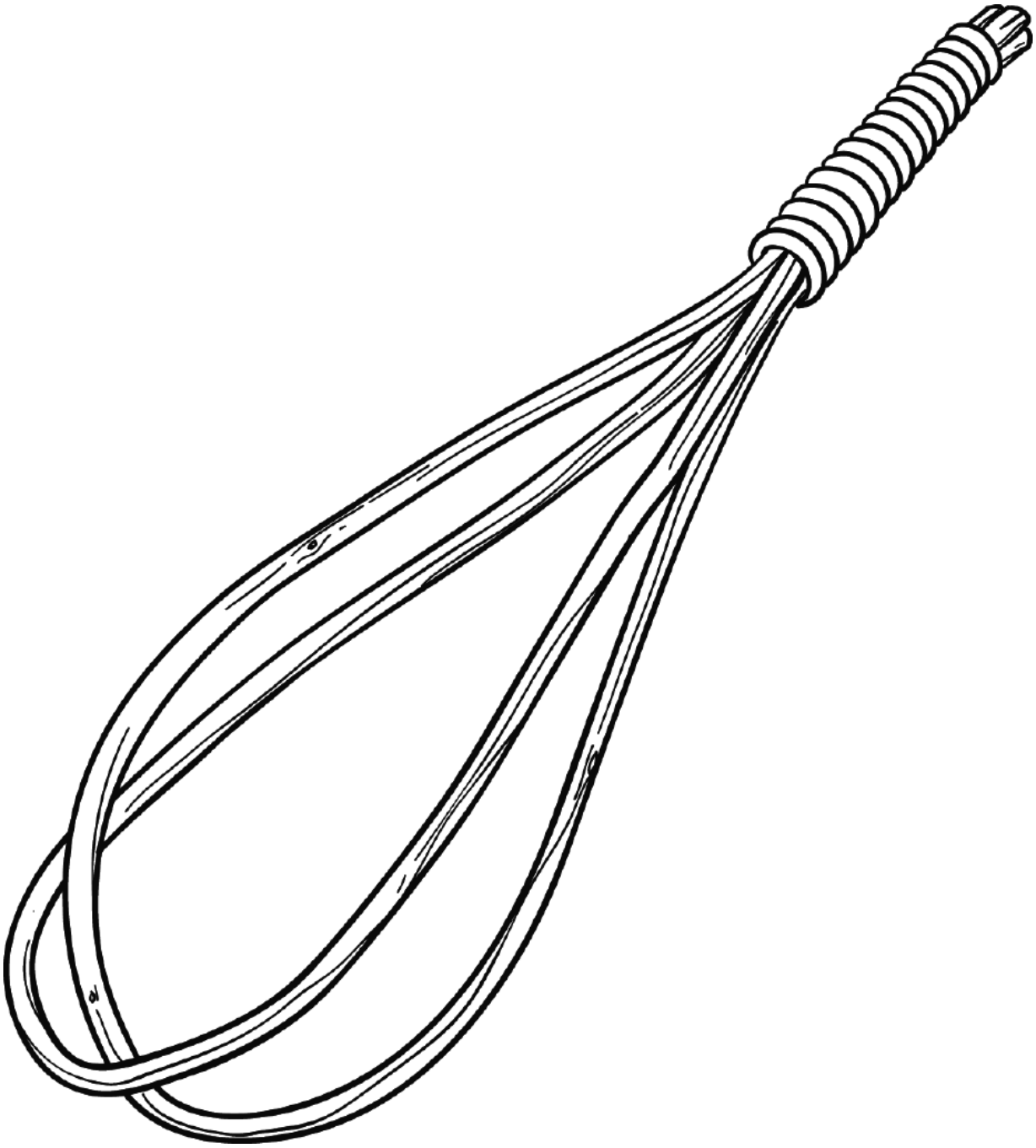

Figure 8.3 Wooden whisk

Improvised Containers from the Landscape

Containers are one of the hardest things to reproduce off the landscape. Making baskets and bark containers that are not watertight isn’t too

difficult, but containers you can actually cook in are a different matter. If you are in an area with stands of large-diameter bamboo, you have readymade containers of all types, but if not you are at the mercy of some more time-consuming and difficult methods, many of which will also dictate the way you can cook with them.

Burn-Hollowed Containers

Burning containers from wood is one of the oldest methods to make containers but also one of the most labor-intensive. It requires a good piece of green hardwood that is large enough to light a fire on, burn a controlled concavity into, and not leak after the fact. You can use a downfallen log for this provided it has no rot or insect damage that may compromise it after the burning process.

Once the wood is selected, place it on a flat surface. It may be necessary to split the log to create a flat area or hewn surface to work with. Build a small fire that is easy to control in the center of the wood. You will want to watch the sides closely and leave about 1" of thickness all around. You can slow the process on the edges by adding wet mud or clay as you go. After it starts to burn, remove the coals and scrape the burnt area to the bare wood, creating a concavity. Then add coals to the fresh scraped wood and begin the burn process again. A tube to blow on the coals and direct air for more heat in some areas will help with control as well.

Bark Containers

Barks are a great container-making resource, especially if the containers do not have to be watertight. However, with the proper materials and a bit more effort, they can also be made watertight. The simplest way to construct a bark container is with folded birch bark, but other barks like

poplar work well, especially in the spring when the sap is running and they are easily removed from the tree.

Bark-lashed containers are easily made from poplar barks in the spring. To remove these barks from the tree it is necessary to split the bark on the tree the length of the container doubled plus an additional amount for the bottom, depending on the size of the container being made. Pick an area of the trunk at least half again the diameter of the finished desired container, to allow for shrinkage when drying, and try to pick an area with no knots or branches.

Split the bark vertically this length and then slip your knife or axe blade under the bark to lift it away from the tree. You can construct a quick spud for prying the bark from any green branch by cutting a single-sided wedge on the end of a 1–2" branch. This will aid in lifting larger pieces away from the tree. Once the bark is removed in one sheet, it can be scored and folded, then punched and laced with inner bark cordage or any cordage you have available.

Be sure to also punch a row of holes around the top and lace an additional piece of split material around the rim for stability and add a handle as you wish from a bent green branch or another split or riving.

Tips and Tricks

- As with utensils you pack in, think about how you can use a tool you make for more than one application to save effort and resources.
- Tools that you’ve made from the environment can be burned in a campfire if you do not plan to pack them out with you.
- Use the fibrous material from the inner bark of a tree as cordage for making utensils.

- Use your imagination. Look around you and use what’s already in the natural environment. A turtle shell could be used as a container (boil the shell before using). A square log could be cut and hollowed out for a cooking pot. Leaves could be used to wrap food for cooking (in place of aluminum foil).
- Tools and utensils you make from the environment are throwaway items (or add-to-the-fire items) as with most quickly improvised tools, so cleaning and sterilizing are truly not an issue, although a good soaking in a boiling kettle will take care of this for a next-day use.

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Chapter 9

Quick Bush Tools

"In wildness is the preservation of the world."

—Henry David Thoreau

Many quick tools and apparatus can be fashioned from wood if you understand simple notches, knots, and lashings. Many hooks and suspension devices can be used for holding a pot above a fire from a crossbar, galley pole, or tripod. Simple toggles are amazing tools and very versatile in camp cooking as well. Quick gambrels (a bar for hanging carcasses) can be made for aid in skinning game, and simple cooking devices as well as ovens can be fashioned from wood and stone.

Pot Crane

To hang a pot, you can create a makeshift pot crane by taking a strong green sapling and laying it at an angle to a rock or log, and driving one end into the ground. Notch the other end to hold the pot over the fire. This will suffice for any one-pot meal. See Figure 9.1.

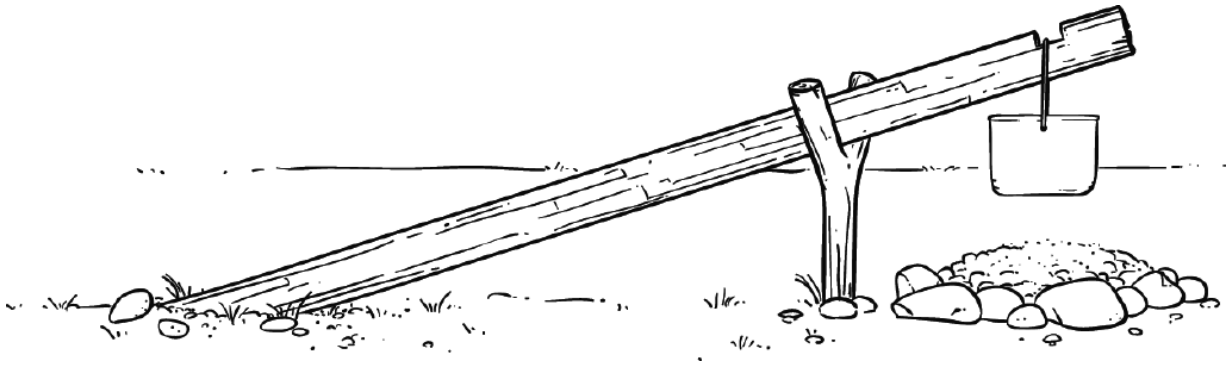

Figure 9.1 Pot crane

Galley Pole and Rotisserie

A simple galley pole and rotisserie are easy to make. Cut two green, forked saplings to the same length, about 3–4' long. Hammer the non-forked end of each post into the ground on opposite sides of the fire pit. Use a simple crossbar made from another sapling to hang a pot over the fire. You can use a couple of notched hooks (metal ones if you prefer) to adjust the height of the pot.

When choosing forked wood, do not use Y-shaped branches, as these will normally split when pounded. Instead use a fork that is caused by a branch growing out at an angle from the tree or larger branch.

If a rotisserie (a spit that turns) is needed, find another fork. This one can be an actual Y branch that is green and long enough to reach both upright posts. See Figure 9.2.

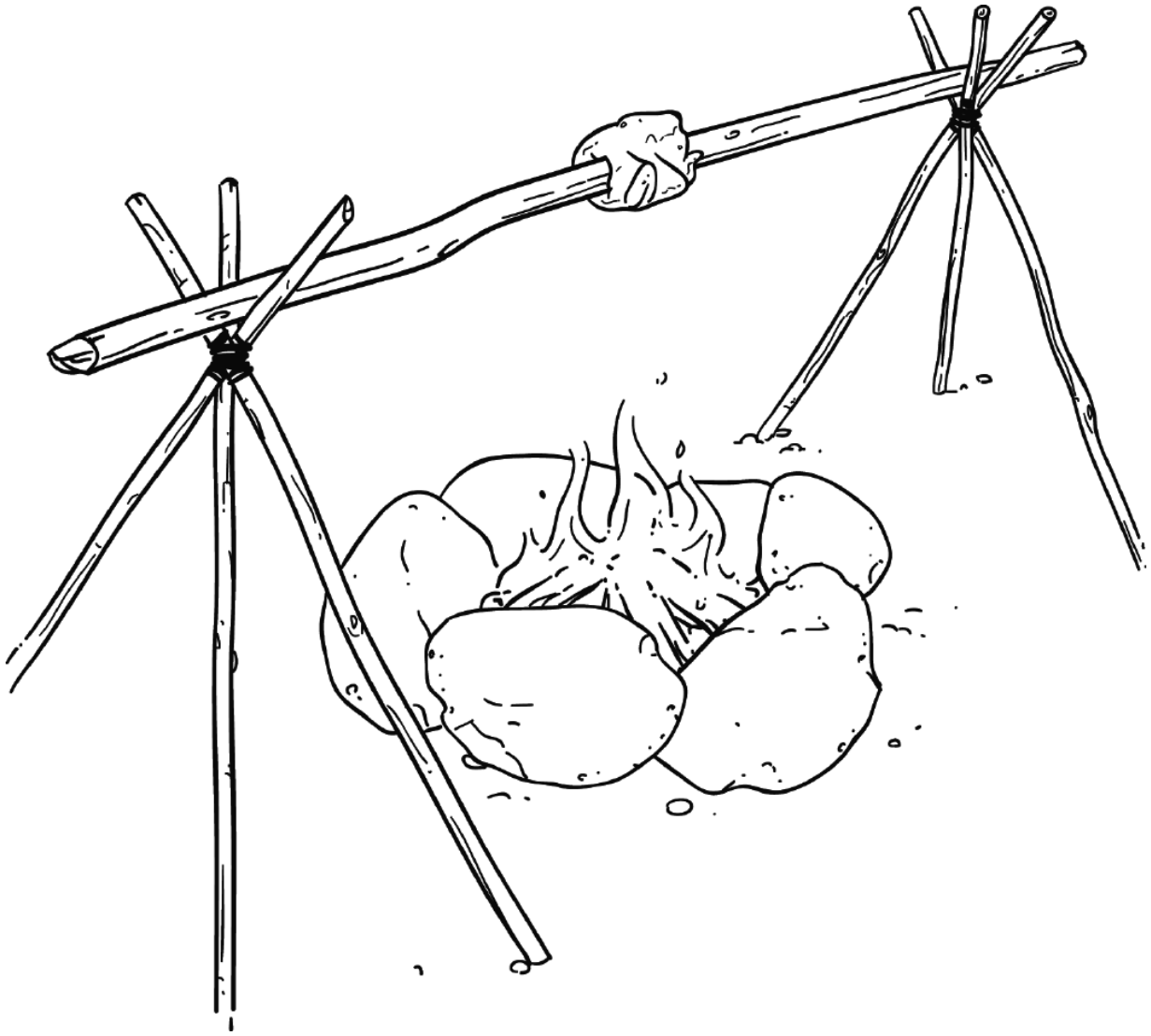

Figure 9.2 Improvised rotisserie

Tripods

Tripods are one of the most useful items one can fashion and can be adapted to create many ways of cooking in camp. Saplings of green hardwood will serve best. Take three similar-sized saplings and lash them together. These can be lashed with a tripod lash, or a simple metal ring can be carried to make things even simpler. See Figure 9.3.

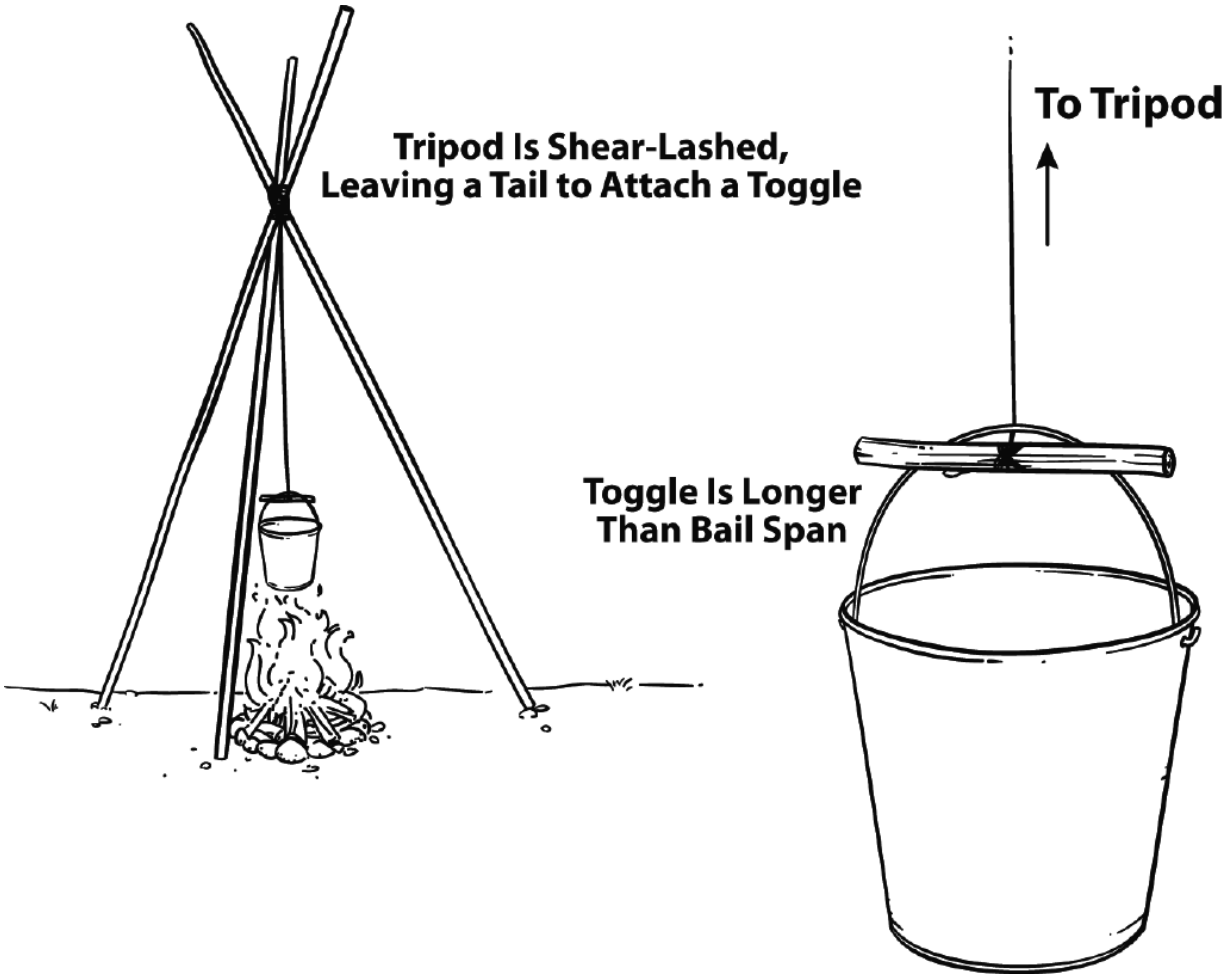

Figure 9.3 Cooking tripod

The Canterbury Camp Citchen

A camp kitchen can be built easily enough from a tripod structure. You can make it as simple as a hanging pot over the fire or as elaborate as a smoking rack or roasting grid. To build the multifunctional kitchen setup that I have coined the Canterbury Camp Citchen, we start with a basic tripod. Then add three short forks lashed about mid-height, one to each leg. The last fork at the apex of the triangle should be lashed facing inward with the other two to the outside. Add three sticks for cross members that can be easily removed when not being used.

On the front or open side of the tripod, the cross-stick should be a bit longer than the other two so that utensils can be hung out of the way of the cooking but handy when needed. If a rack is needed you can now cut and notch simple cross members to fill in this triangle. These also can be removed when not in use.

From the center of the tripod, build an adjustable trammel (hook mechanism) of cord and a notched stick. You can add or remove this depending on the cooking style for that meal. Several hooks should be created for the longest cross-stick for hanging more than one cooking container over the fire as well.

The utility of a tripod cannot be overstated as it is easily adjusted both in span and axis to adjust things over and closer or farther away from the fire using a trammel or hooks for micro adjustments. See Figure 9.4 for a closer look at the adjustable trammel.

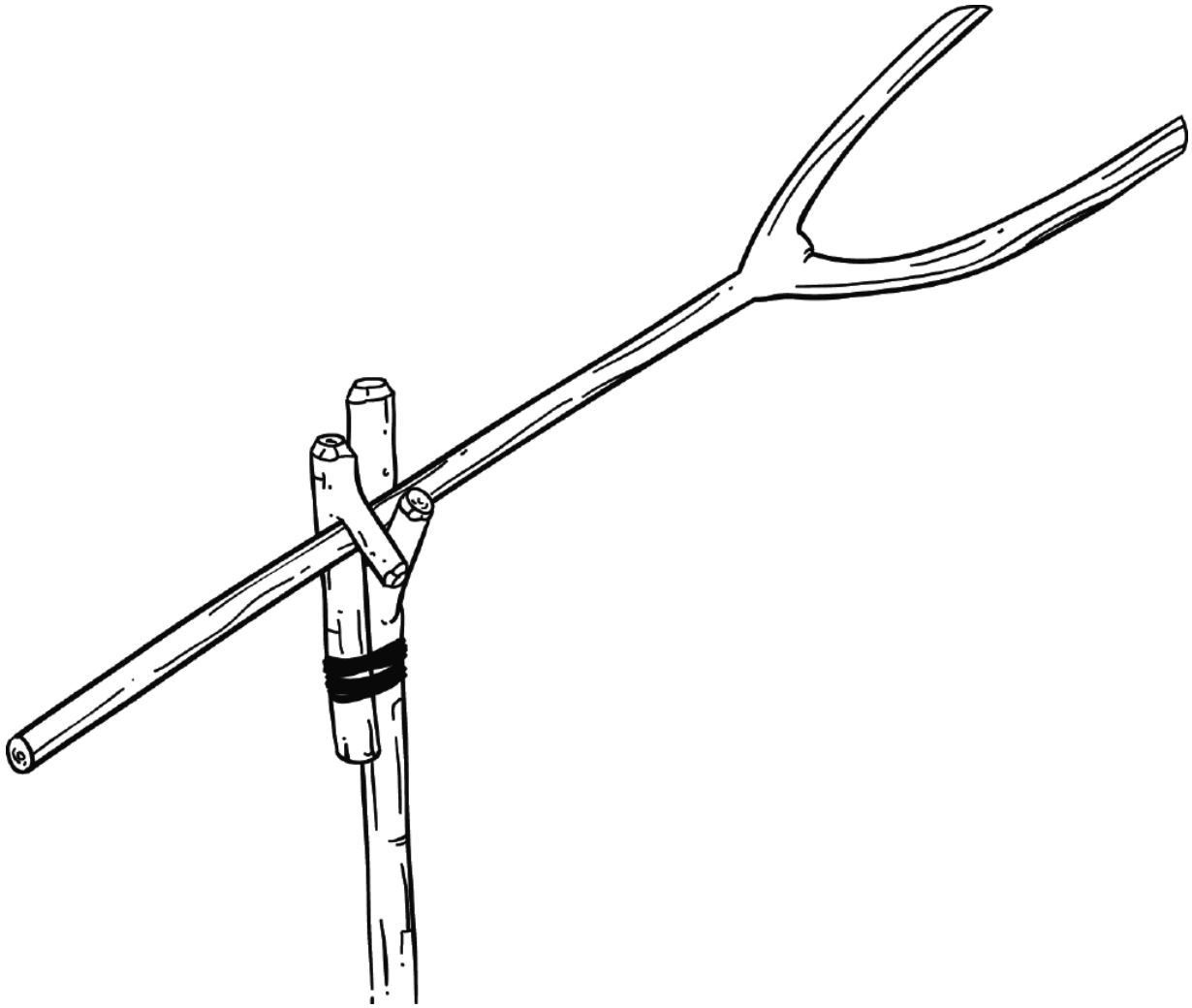

Figure 9.4 Adjustable trammel

If you want to use this for baking or smoking, an emergency space blanket wrapped around the outside of the tripod, reflective side in, works a treat.

Raised Hearth

If you desire a more permanent solution that can be very comfortable to cook on and works well in areas of fire danger you can build a fire altar or raised hearth. This is accomplished with natural materials by building a log box about 40" high and rectangular in shape about 3' × 4'. Fill the inside

with dirt and build the fire on the top. Forks and uprights with galley poles can be added for hanging pots over the fire as well. This makes for a comfortable cook setup, and things like clay ovens can be built to one side easy enough for long-term use. See Figure 9.5.

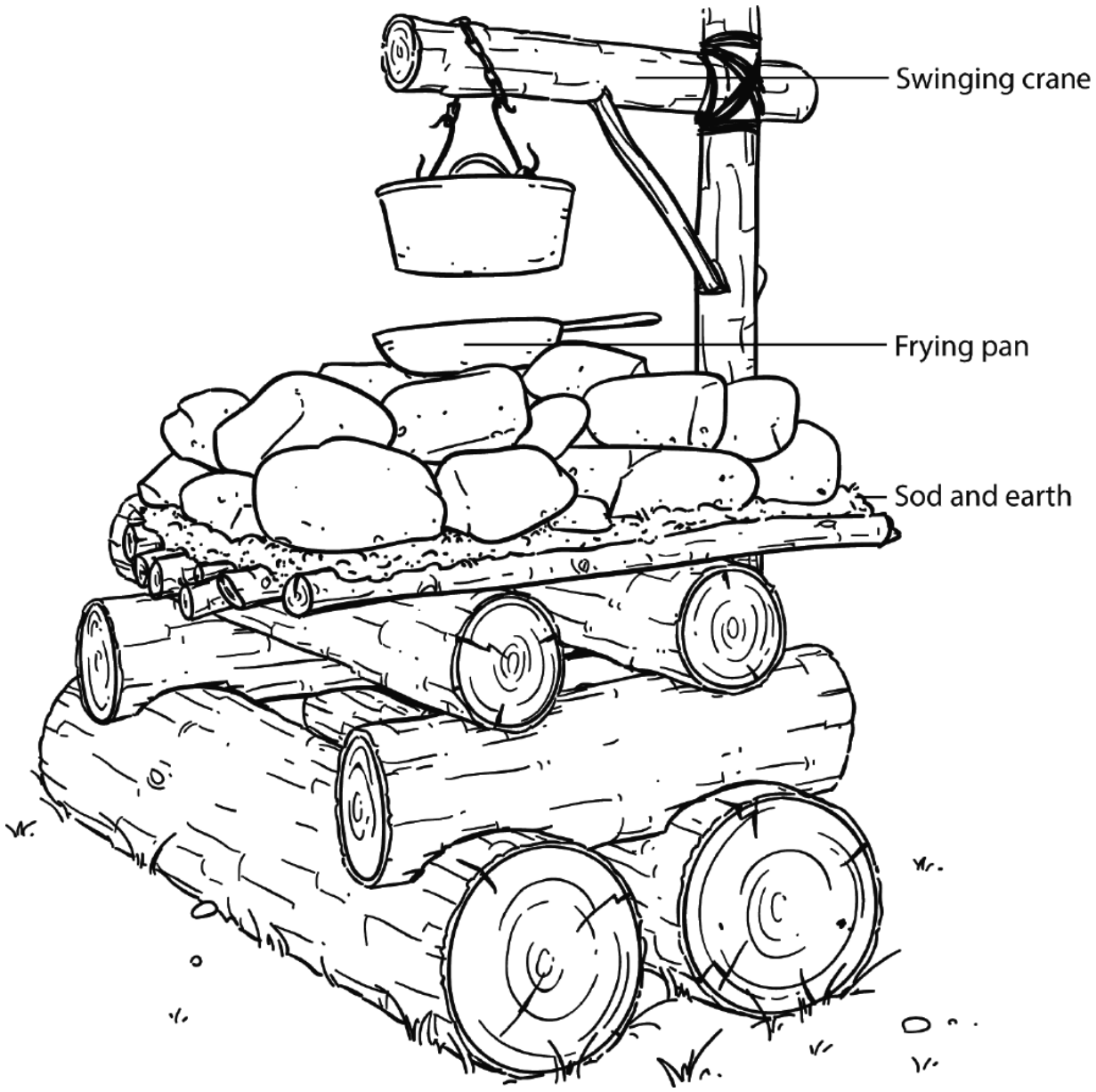

Figure 9.5 Altar kitchen

Other Field Expedient Containers and Cook Pots

It is fairly easy to make a cook set from simple food cans after they are emptied. You can make a cooking pot just by using a can opener! A #10 can (such as a coffee can) makes a great cook pot especially if a bail is added made from bailing or trapping wire. See Figure 9.6.

You can fashion a cup out of a smaller soup-sized can. A plastic soda bottle will fit inside this for a canteen. A heavier Gatorade-type bottle can fit in a slightly larger stew can. You can wrap wire around the smaller can to create a handle and punch holes in the #10 for a bail wire. If you add a stew can with a tuna can upside down, you have a lid for a smaller pot as well, and if you feel the need for a skillet, a dollar-store pie pan will suffice well. Use a pair of cheap pliers as a handle. This skillet can double as a plate.

A folded sheet of heavy tinfoil for roasting envelopes would round this out nicely for easy cooking on a budget or for a school project.

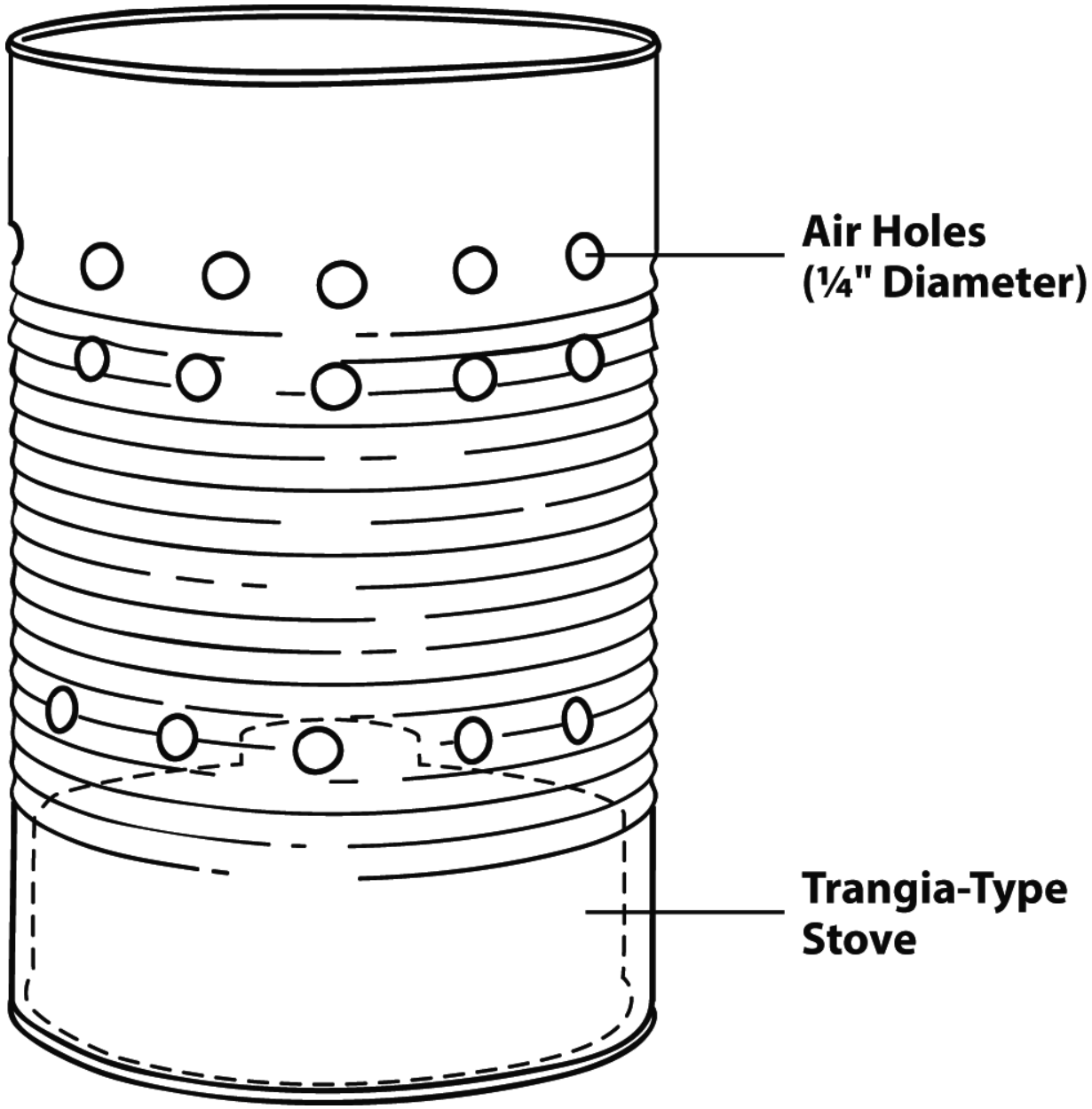

Figure 9.6 Tin can cookware

Other Unconventional Cookware

There are lots of things we can use to cook with that we don’t consider most of the time. Dog bowls, for example, can be found in a variety of sizes and depths in stainless steel and are very inexpensive. These make great pans when coupled with pliers for a handle. Two of these stacked opposite and

connected with metal binder clips make a great little baker, and since they nest inside each other that makes it an easy carry for sure.

Gold pans (which have deep sides) are still available in steel. They also make good skillets and plates and become multifunctional depending on your activity in the outdoors. I have cooked everything in a gold pan from fish to baked beans.

Hubcaps, in an emergency, can be used for boiling water or cooking once they are cleaned out well, provided they are metal.

Clay Oven

To make a clay oven you need some decent clay that is fairly clean. Good places to look for this are around creek banks in many parts of the eastern woodlands. Collect a couple of 5-gallon buckets full of clay and take them back to camp. If you want to make pots or vessels for cooking, the clay will need to be cleaned and then mixed with a binder like cattail fluff or sand. If you are making an oven, you can pretty much use it as is.

On a flat surface, build up a mound of damp soil the size you want the inside of the oven to be, then cover this with clay about ½" thick all the way around the dome. In an hour or so on a good sunny day the clay will be hard enough so you can carve and remove an opening in the front and a chimney or draft hole in the top about 2–4" in diameter.

Leave the rest to dry in the sun a couple of days until the exterior feels hard, then carefully dig out the dirt from the inside and build a small fire within the oven. Gradually build the fire up to fire the inside of the oven. If all goes well, you can cook in the oven by spreading hot coals to the side and placing food to cook in the center. See Figure 9.7.

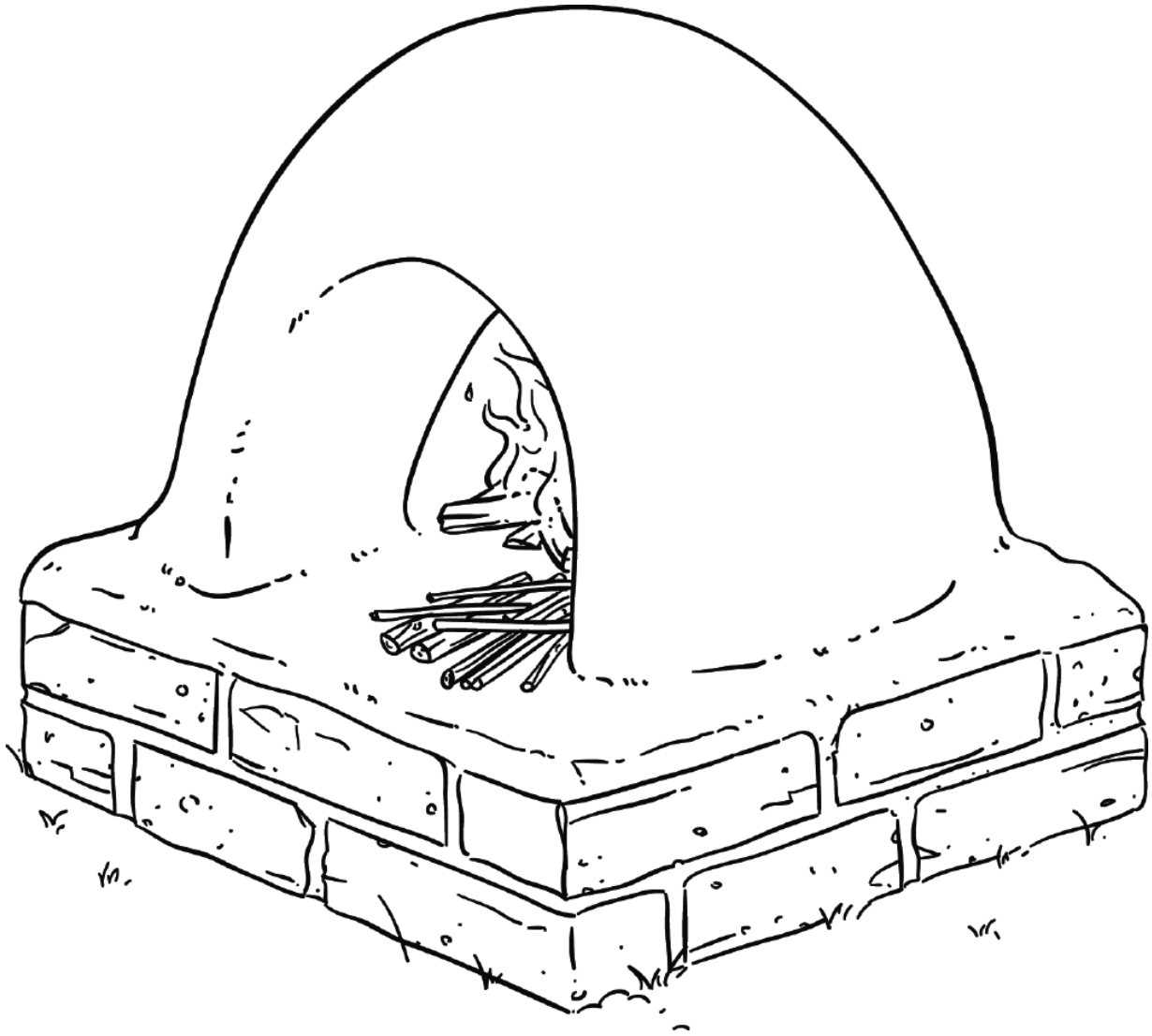

Figure 9.7 Clay oven

Bushcraft Tip

You can also use clay to cook small mammals, fish, and birds. Gut the game item first and cut off head and feet. There is no need to skin or pluck it. Instead of wrapping it in foil, mold clay around the game completely (no scales, fur, or feathers should show). Then place it in the coals to cook. When the clay hardens, break it and pull it away from the game item. (Cooking time varies, but expect it to take an hour or so.) Feathers, scales, fur, and other inedible parts come away with the clay.

Items Needed to Process Food

We've discussed the equipment you will need for cooking and eating your meals but we haven't yet discussed the tools you will need to process the food. We must always consider cutting tools that will be needed for the task since these are less likely to be something you can just knock together on the spot. You want to consider bringing or packing them in.

- **Knife:** You will undoubtedly have some type of knife with you. I always prefer a butchering-style blade for a sheath knife. If you have a good stout belt knife, you have an advantage for processing food.
- **Ulu knife:** Another good tool to throw in the pack is the hash knife or ulu. The curved blade on this knife comes in real handy for everything from dicing veggies to skinning game. They are usually lightweight as well.
- **Axe or hatchet:** Your axe or hatchet, as well as the saw you carry, can help with big-game processing.

- **Saw:** Many folding bucksaws have options of a bone-cutting blade, but a hacksaw will work fine. A 12" tubular bucksaw works well for processing wood and is easy to get hacksaw blades to fit, making it a more versatile tool around camp. Bahco makes a 12" saw that can be purchased with both a green wood and hacksaw blade in one package. The best thing about tubular frames is they are near indestructible if you can pack them in.
- **Pliers:** A good pair of old fencing pliers is most always in my kit. They can be used to skin a catfish, strip the tailbone from an animal, or lift a pot lid from a Dutch oven. They also make something great for grabbing the bail of a hot pot when removing it from the fire and carrying it to where food is served.
- **Measuring tools:** A couple of measuring devices will help and can be improvised by marking measurements on your camp cup and making your eating spoon about a tablespoon in size.

Metal Cooking Apparatus

If you have a permanent camp or have conveyance, you may choose to carry metal or forged cooking apparatus. If you are packing fairly light, you can still carry some steel. Some of these items can save aggravation and time, making camp life more enjoyable as well.

Fire Irons

While two green logs of similar diameter make a fine temporary placement for pots and pans with a fire built between, fire irons make life much more tolerable and weigh only 2 pounds. These are flat irons made from metal stock about 1.5" wide and 24" long. They can be placed on logs or rocks with fire underneath and are adjustable to accommodate different

pans and pots. Because they are flat steel they are long-lasting and easy enough to straighten in case they get bent. See Figure 9.8.

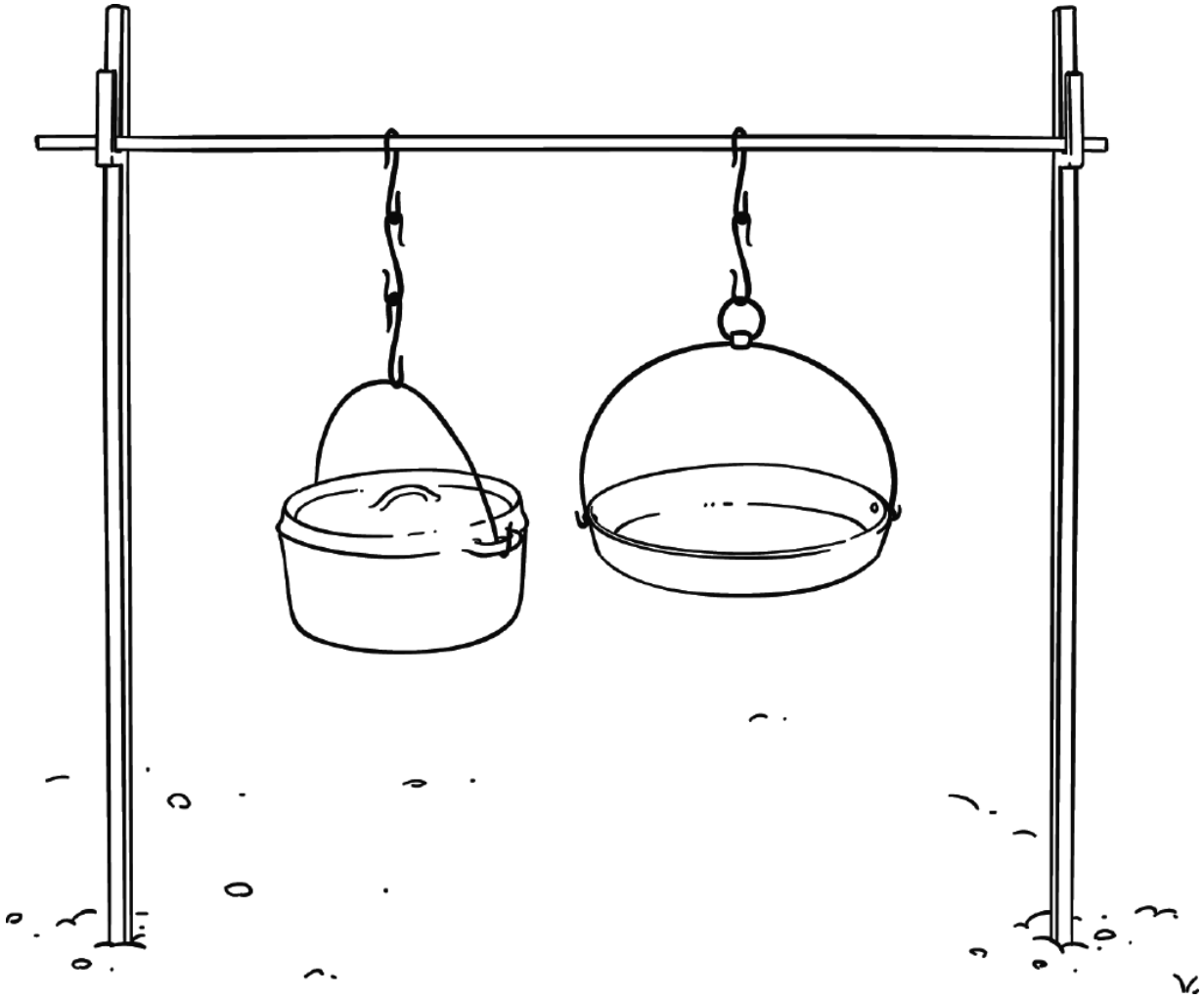

Figure 9.8 Fire irons

Chains and Trammels

One thing that can make life much easier and make you feel safer in the long run if you don’t have as much experience with carving wood implements is to carry a light chain with a hook on each end, running about 18–24" long. This can serve the function of adjusting pots over the fire whether from a tripod or a galley pole.

Trammels are another item that make small adjustments possible. You can easily fashion them with light chain and a straight rod bent at 90° on the top ½". Shape a hook to hold a pot on the bottom. The hook can be slid up the chain through the bottom link and then hooked at various intervals in the hanging chain to adjust at one-link increments the length of the trammel.

Tips and Tricks

- Utensils and tools need be nothing more than from the kitchen drawer or a Goodwill shop and can be had for very little. These can be heated in the fire and bent for packability if necessary.
- Forged cook systems can be made or bought depending how handy you are and whether you have the necessary equipment. You can buy these at various wilderness outfitters.
- Skewer cooking doesn’t have to be fancy. If you can shove a sharp stick into it and hold it over the fire, there’s no need for complicated equipment.
- Cooking irons can still be found secondhand and can be used to make hot sandwiches, pies, and other treats.
- Tripods can be used to increase the amount of cooking area you have. One dish can be cooking suspended from the tripod while another cooks in a skillet or in a foil-wrapped packet on the coals below.
- Tripods can also be used for other camp chores. A rope strung between two tripods makes a handy clothesline.

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Chapter 10

Types of Cooking

"Cookery means . . . English thoroughness, French art, and Arabian hospitality; it means the knowledge of all fruits and herbs and balms and spices; it means carefulness, inventiveness, and watchfulness."

—John Ruskin

There are several ways of cooking over a fire. Each method means the food and fire are manipulated differently. In this chapter, we'll cover the most common methods of camp cooking and show you how to prepare tasty meals no matter which approach you take.

Frying

In frying food we do not want any flames or even large coals. They can interfere with the evenness of the heat or cause the food to burn. You should rake a thin bed of coals away from the fire so that a skillet can be placed directly on top of it. If you're planning for a quick meal, then an initial fire of only kindling-sized sticks will provide this fairly fast. With the initial flames, you can heat water for coffee if you wish.

Too much heat will burn grease or fat, giving the meat a nasty aftertaste, so be careful not to cook directly over the hottest part of the fire.

If you have an excess of grease or lard you can fry directly in a pool of it. Just heat it to the point it begins to bubble, then place small pieces of meat directly in the grease, turning them over once to complete the frying

process. You can remove these from the grease and place on anything absorbent to soak up excess grease before serving hot.

If you are traveling with limited grease you can heat the pan on the coals and fry the fattiest portions first. If this is not an option, use just enough of the grease that you do have to keep the meat from sticking to the pan and proceed.

Remember that any fat or grease used for frying fish should not be used for any other foods or it will give it a fishy flavor for sure. Small game is best cooked by cutting it into small pieces and frying, then serving with a gravy mix that can easily be carried in packets.

Broiling

For broiling meat we want to sear it first to lock in the juices. This means placing the meat momentarily in open flame to quickly dry the outside and create an insulating skin over the inner meat.

Spit Broiling

Broiling should be done just on the edge of a bed of hot coals on a stick, spit, or cooking fork. Cut the meat approximately 1" thick. You want to be able to catch any dripping to baste the meat while cooking so some type of catchment will be needed. It should only take about 5 minutes to broil a steak this size. Serve with drippings and melted butter. Don’t season till you’re finished cooking.

A fowl can be split in two pieces or just split open for broiling. Fish can be cut open and broiled on a green wood frame.

Pan Broiling

Broiling can be done in a shallow, covered pan if the meat is turned often.

Rock Broiling

If you have to broil on rocks, take two flat rocks, clean of debris, that are not from near a creek or moist in any way (moist or wet rocks may explode when heated). Place them one on top of another in the coals with a series of rocks between to form an oven. Build the fire up to heat the rocks, then wipe away any debris after it burns to coals again and cook meat between the rocks. Another option is to suspend an old auto rim or grill grate off the ground with a few rocks.

All these things can provide a solid cooking surface as well as containing the heat. As with any cook oven, the goal is to contain the heat and keep it on the food to be cooked. See Figure 10.1.

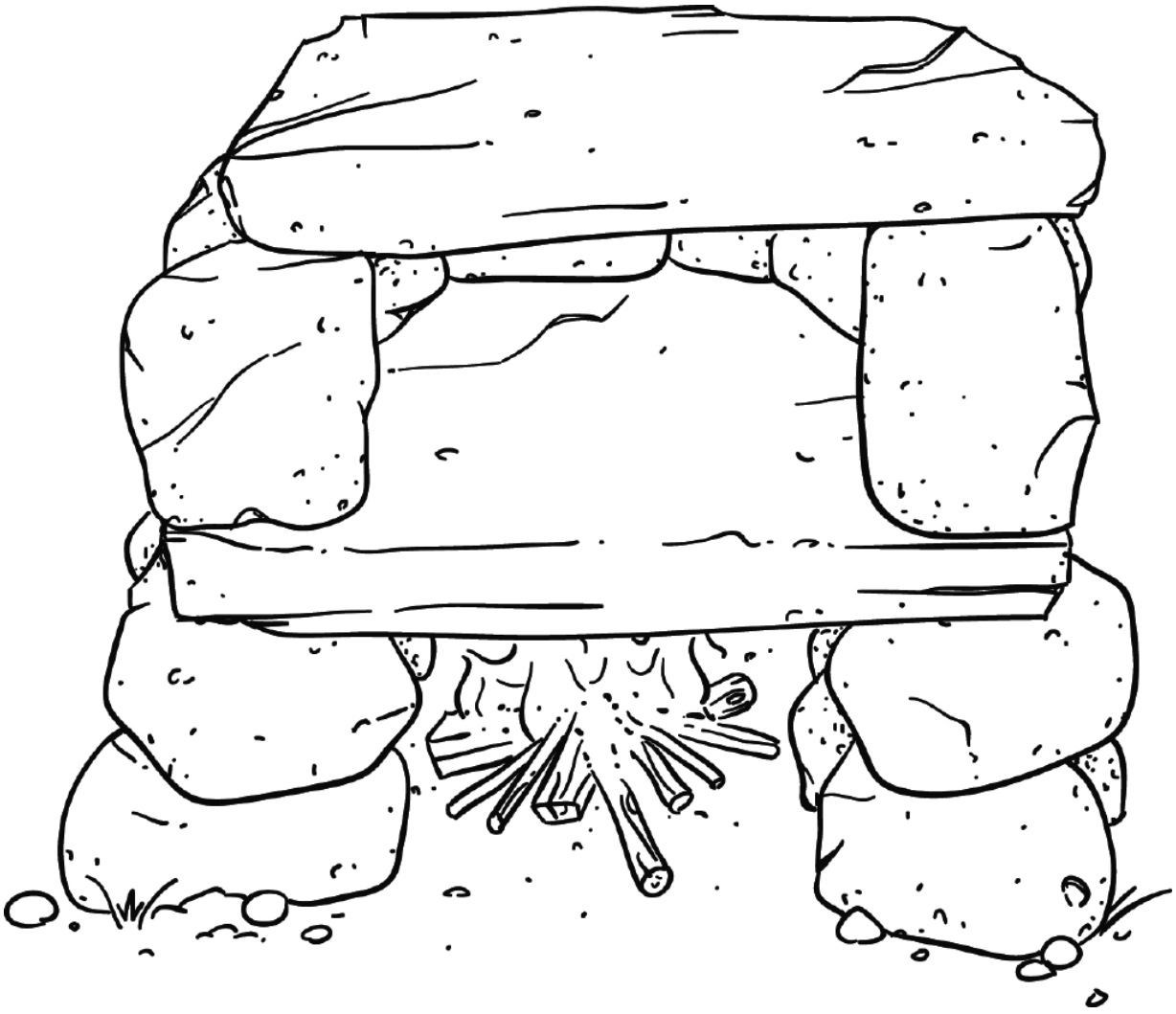

Figure 10.1 Rock oven

Roasting

You roast meat by placing it in the direct heat of the fire. Do this by placing meat above a good hot coal bed on a spit or fork. Roasting works best with a fire backing of some sort, whether it be rocks or logs to help direct heat back by thermal mass onto the cooking meat.

As with other forms of cooking, always sear the meat over open flame first to lock in flavor. Meat being roasted on a spit should be turned in ¼-turn increments. Meat and fowl can also be suspended with a stout cord. A

paddle added to the string will turn the meat slowly with the rising heat from the fire.

Gravy goes well with roasted meats. You can also roast meat in a reflector oven before the fire. The meat should be basted with its own juices as it cooks.

Braising

Braising is the best thing for tough cuts of meat and is a bit between frying and baking. Place about 2" or so of water in a shallow pan that can be covered. Add some fresh vegetables, like onion and maybe a clove of garlic, then add the meat, cover, and cook over coals about 15 minutes to the pound. About 20–30 minutes before the meat is finished, add seasonings like Old Bay or seasonings of your choice.

Baking

Baking is generally done in a sealed container of some sort. There are many ways of doing this, and it allows for the addition of other ingredients including liquids, like water, wine, liquors, or other types of marinades as well. The main thing about baking that differs from other methods is really producing a fairly even amount of heat surrounding what is being cooked. This is easily accomplished by cooking in a Dutch oven, baker, or in an envelope of aluminum foil. Cast-iron cookware helps evenly distribute heat, so it is a good choice for baking.

Boiling

When boiling, you'll need a good pot or bucket. The wider and shorter the pot, the faster it will boil due to surface area above the fire, but a bucket

will do as well. The best thing, I find, is to paint metal cookware black with high-temperature paint. I do this before going to the field. The metal will heat up faster this way when fuel is a resource to be conserved.

Add fresh meat to already boiling water; meat for stews should be started in the water when it is cold so it will heat up more slowly, releasing its flavor to the water.

Boil meat until it falls free of the bone, and it should be good and done. If you have vinegar a few tablespoons will help tenderize meat. Season boiled meat a few minutes before it is done. If you are going to eat fresh meat, add it to a rolling boil for 5 minutes or so to lock in the juices and then remove it and cook it above the fire as normal.

If you desire a thicker soup, you may simmer it after cooking for about 30 minutes and add some instant potatoes or JAW biscuit mix and stir often as it simmers.

Stewing

Stewing is the slowest process of cooking and should be reserved for the toughest cuts and types of meat. Coyote is a good stewing candidate as the meat is fairly tough even in the best cuts. Use lean meats only for stewing and again lock flavor in by browning quickly or boiling for 5 minutes.

Reduce water to approximately a pint or so for one person. Add a soup stock if you have it or some bullion, add a couple of ounces of flour as a thickener, and bring the contents to a boil. Add some salt, pepper, and or curry powder, depending on your taste. Old Bay works great here (use about 1 tablespoon per serving). Then cover the pot and simmer 4–5 hours. You can add potatoes to thicken the stew as well, and dried soup greens make an excellent addition to the pot as well before simmering.

Steaming

Steaming is cooking with hot moisture, and works well for vegetables as well as fish. This is best accomplished with a steamer if you have one but can also be done with a campfire. To accomplish this, place several dry stones in your campfire to get them red-hot. Dig a hole large enough for the stones to fit inside along with food, leaving enough space around them for insulation. Locate the steaming chamber somewhere proximal to the fire.

Place the heated stones in the hole and cover them with a thin layer of wet grass or leaves, then place food on top of this followed by more wet leaves and grass. Fill the hole with loose earth and poke a hole in the top down to food level. Pour some water into the hole and immediately plug the hole to stop the release of steam and hold it within the chamber created to steam the food.

Tips and Tricks

- For baking, using a small pot (with the food to be baked) within a larger pot helps ensure even heating. Cover the larger pot with aluminum foil or a lid to help retain heat. Put a small amount of water in the larger pot to create steam for a crustier texture, such as when baking bread.
- When cooking in a Dutch oven (particularly baking), put coals beneath and on top of the oven.
- When cooking on a wood fire, remember that you need different kinds of heat for different kinds of food. Water can be boiled over a high flame, and stews can be cooked over a low flame; most other foods are cooked over coals. Coals hot enough to cook over look grayish white.

- A lightweight grill can be a useful piece of equipment; grill directly on it or use it as a platform for a pot to boil or steam.
- All camp cooking should be done outdoors, regardless of the exact fuel and setup you’re using. Make sure the area around and above your cooking area is clear of debris, shrubbery, and any plant matter.

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Part 3

Living Off the Land

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Chapter 11

Hunting and Trapping Game: Fundamentals

"Man is the only animal that can remain on friendly terms with the victims he intends to eat until he eats them."

—Samuel Butler

This topic could take up an entire volume in and of its own! But in this chapter, I am going to cover the basics that will give the most success while hunting and trapping in primitive fashion. For our purposes, we're looking to hunt and trap edible food; we're not trying to trap for fur or anything like that.

Locating Animals

Hunting is a skill set all its own, and to be a good trapper one must be a good hunter as well—not in the sense of being able to catch prey necessarily, although that is the end game, but knowing where the game will likely be at a given time. This is the key to success in both skills; the rest will come in time.

For both hunting and trapping there are legalities to follow: licenses, tags, method of take, and size or type of animal and even sex in some cases. Once you are armed with the proper permissions, you can begin hunting.

The first thing to learn is where to go to find your prey, no matter your chosen method of dispatching the animal.

Animals have many things in common with people. They need water, food, and shelter or cover that protects them from both severe weather and predators. Understanding your prey will help solve the puzzle of finding then.

Game Trails

If an animal like a squirrel is known to prefer hickory nuts, then the most obvious place to find a squirrel is in an area with lots of these trees around. All animals will need water, so any location that has a single water source such as a small pond is a great place to look. If crop fields are near your location, this will feed many animals like raccoons and deer, and these are a good place to start. Any open field with low-growing browse forage is a good place to find deer and rabbits.

Animals prefer to travel in certain ways and at certain times. Understanding this will help you key in to areas for hunting and ambush as well know when travel routes can be found between the areas mentioned previously. Most animals travel the same game trails daily. They prefer the path of least resistance. Some animals prefer higher ground; for instance, minks and raccoons will travel along bank lines to forage for food, but a deer is more likely to travel down from higher ground and then pretty much straight back up from a creek or stream. These are all animal behavioral clues that a wise hunter understands.

Impact of Weather

Weather has an effect on animal movement. A front like rain or cold will cause animals to move. Moon phases have a great effect on salt-water

fishing and maybe some effect on shallow-water fishing, especially on full moonlit nights. Fish in shallow water see movement from above. Even just the shadow of movement can trigger a flight response, so full moonlit nights have to be treated as sunny days and some stealth may be necessary on such nights to catch fish in shallow water. But moon phases are not the major determining factor in upland game movement.

Temperature however does have great effect on movements of animals, especially during the hunting seasons, generally fall and winter. For a long time, many hunters have believed that the day before, day of, and day after a full moon are times when deer do not move. However, this is greatly dependent on temperatures. If it is unseasonably warm on these days, then the old tales hold true and upland animals tend to not move but on cold fronts they seem to move no matter the moon phase.

Bushcraft Tip

Spot-and-stalk hunting is a slow methodical process. Oftentimes you take a few steps an hour, depending on the situation. Still, hunting will usually be from an ambush point like a known travel route, where you'll wait for the game to come to you. Understanding the animals' behavior will aid in both instances.

Animal Behavior

To be effective hunters and trappers, we must understand that all animals need the same things we do: shelter, water, and food. If we understand the routes animals use to obtain and move from one to the other, we can recognize good places for hunting and trapping them. Useful information to

have is a working knowledge of what the target animals eat, where they live, and where they travel.

Animals are predictable to a certain degree, and understanding the patterns of their movements will also help us increase numbers of animals caught or spotted, whether we are trapping with primitive or modern traps or hunting or a combination of all of these.

Beyond requiring shelter, water, and food, an animal's sole purpose in life is reproduction of its species. Animals are most relaxed when sleeping, followed by traveling to and from a feeding or watering area. They are most wary when feeding or watering. Remember that animals will travel on the same routes most of the time depending on season, and they can be patterned because of this.

But because of this, they, like you, can recognize when something has changed in their direct environment. While scent of humans is nothing new to an animal, changes like a trap set in the area may take a couple passes to overwhelm the curiosity. So be prepared to wait it out, and don't get anxious because a trap has not been visited or tampered with in 48–72 hours after it is set.

Animal Sign

Animal sign is the key to successful hunting and trapping. Do not waste your time hunting or trapping where there is no sign.

Sign is anything the animal leaves that is a trace that it passed through the area. Because animal behavior is somewhat predictable, if an animal has passed through a certain area, it is likely he will pass again.

There are seven types of sign we need to be familiar with and this familiarity will help us identify things like species, eating habits, and numbers.

1. **Tracks.** Tracks of an animal are the easiest way to identify species and can also help with numbers and frequency of travel in that area. See Figure 11.1.
2. **Scat**. Scat left when the animal defecates can identify species as well as what the animal is currently foraging on.
3. **Slough.** Slough is something from the animal's body left behind after it is gone. It could be hair left on a fence wire, a feather dropped while preening, or the shed skin from a snake.
4. **Remains.** Remains is the carcass of an animal. This will not only provide bait for other traps but also may give some idea of other animals like coyotes or foxes in the area. Obviously, if there is one that is dead there are surely more as well.
5. **Refuse.** Refuse is the animal's garbage, what it has left after feeding, that will help identify its species and its travel routes. Refuse may be a squirrel's midden (areas where they have eaten lots of nuts or are digging and eating stored nuts; it will be littered with shells), or it could be the chewed trees and branches left by beaver or muskrat.
6. **Dens.** Dens are the animal's home: holes in the ground, in the bank, or in the hollow of a tree. Many times we can tell species from this sign alone.
7. **Odor.** Odor is the trickiest. Cat urine has a distinct smell; so too does the smell of rotten meat from a carnivore den, like that of a fox. Obviously you would smell a skunk in the area, but you can identify other subtle smells as well.

Coyote

Red fox

House cat

Raccoon

Striped skunk

Beaver

Oppossum

Woodchuck

Muskrat

Mink

Otter

Dog

Gray squirrel

White-footed mouse

Whitetail deer

Cottontail rabbit

Crow

Turkey

Figure 11.1 Animal tracks

Tips and Tricks

- The early morning and late afternoon will often yield the better results when hunting and trapping.
- You can use bait animals to lure food animals. These bait animals are the animals that every other animal seeks as its food. Animals found in or around the water's edge fit this category very well—think frogs, crayfish, and fish, as well as mussels and snails.
- Knowing what the target animal eats is another important factor in success in trapping because a baited trap is about a hundred times more likely to catch an animal than a not-baited set.
- All states require hunters to take hunter-training classes, so don't be surprised if you're asked to show proof that you've fulfilled this requirement before you're allowed the necessary hunting licenses and permits.
- If you haven't hunted or trapped before, think small. Keep your expectations to a minimum, and don't think you need to buy every possible gear item to succeed.

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Chapter 12

Hunting: Beyond the Basics

“For us, hunting wasn’t a sport. It was a way to be intimate with nature, that intimacy providing us with wild, unprocessed food, free from pesticides and hormones, and with the bonus of having been produced without the addition of great quantities of fossil fuel. In addition, hunting provided us with an ever-scarcer relationship in a world of cities, factory farms, and agribusiness—direct responsibility for taking the lives that sustained us, lives that even vegans indirectly take as the growing and harvesting of organic produce kills deer, birds, snakes, rodents, and insects. We lived close to the animals we ate, we knew their habits, and that knowledge deepened our thanks to them and the land that made them.”

—Ted Kerasote, *Merle’s Door: Lessons from a Freethinking Dog*

When it comes to hunting for small and medium game, nothing can match the versatility of the shotgun. There are lots of choices out there, so understanding a bit about the true possibilities will help you decide. I have settled on a single-shot break-open gun as my choice for many reasons I hope to explain here.

Gun Considerations

Two huge factors in choosing a weapon for hunting are weight and simplicity of its mechanisms. Weight matters if you’ll be carrying the

weapon for long periods, and simplicity of mechanism means fewer problems are likely to occur and maintenance is easier to do.

One thing we need to look at for versatility's sake is the age of the gun as well as the chamber length and choke. The choke is a reduction in the barrel's outside diameter that allows the gun to pattern better at distance but does give some restriction on loads, especially hand loads and muzzle loads.

Gun Age

First to the age of the gun: You want something modern enough that it was made to withstand the use of modern powders, not just black powder charges. You also want a good quality steel barrel. Most guns made after 1940 will meet this restriction, and you will be fine with any gun made in the past 50 years that is in sound working order.

Chamber Length

Next you want to look at chamber length. This is the area in which the shell is loaded at the breech. You want this to be a 3" chamber so it will accept any load you can find or buy to put in the gun. Many modern shells are 3", and if you have a 2¾" chamber, such shells will be useless without modification.

Choke

The basic chokes are cylinder, modified, and full. They get progressively smaller from cylinder to full, with modified being the happy medium. Cylinder bore is fine but you will sacrifice accuracy past 20–25 yards for sure, while modified will keep a good pattern with a modern shell

to about 35 yards. Again the tradeoff for choke is load variation and adaptability.

Bushcraft Tip

My main carry gun is an H&R single-shot 12-gauge shotgun with a modified choke and a 26" barrel. I find this to be the perfect gun for running the woods.

Barrel Length

Barrel length is a matter of personal preference, but I find that anything over 24" is as accurate as 30". Most shots we will take with these guns are short-yardage shots anyway, and added barrel length is added weight.

Rounds

Let’s first speak of store-bought modern rounds and the versatility of that beautiful old SS 12GA. I have a great deal of variation in loads and game I can hunt with this gun with little or no modification to anything

- #8 shot for small birds
- #6 shot for small game
- #4 shot for large waterfowl and turkey
- Slugs or buckshot for larger game

Just this gives me a huge array of animals I can hunt by only carrying a few shells and the gun if I am determined to make my supper from hunted game.

Subcaliber Adapters

Now let’s explore a bit more of the modified versatility of this gun beyond normal 12GA store-bought ammo. Subcaliber adapters come in many different types. First let’s look at shotgun calibers. I can buy adapters that are 3" for my chamber to accept 20GA and 410GA, as well as with that adapter 45 Long Colt pistol cartridges. Now I can shoot any type 20 or 410GA shell as well as any 12GA shell in any chamber length up to 3".

There are also 8" adapters that are 3" chambers and rifled to shoot most pistol cartridges including 9mm, 38, 40, and 45ACP, as well as rifle cartridges in 22LR (long rifle), 22WMR (Winchester Magnum Rimfire), and 17HMR (Hornady Magnum Rimfire).

Now I have a whole other realm of possibilities for my lil 12GA, and I can easily match my sidearm to the gun for safety if one fails. The rifled adapters are surprisingly accurate especially at 30 yards or less, again normal small game ranges. The 20GA, 410, and a 3" rifled 22 also come in what’s called a “stack pack” that all fit into each other like a nesting cook set and can be carried in a small waterproof container, taking up little room in the kit.

Reloading Spent Shells

You don’t have to purchase tools to reload a shell in the field. What you may already have will work. First, we need to cut the old crimp from the shell, and our knife will do the job fine. Cut the crimp so that the shell is 3" total length for the chamber. Then we need to remove the spent 209 primer from the shell before seating a new one.

Replacing the Primer

Removing the old primer requires an anvil to create space where the old primer can be pressed out. Several washers glued together will work for this or just a hardwood board with about a ⅜" hole drilled into it works fine. Make this anvil (whether of washers or wood) about ½" thick to ensure the primer completely clears the shell when removed. I use a simple piece of scrap metal about ½" thick by 2" × 3" for this tool, and it works well in the next step to seat the new primer as well.

Place the shell on the anvil with the spent primer over the hole in the anvil, and use a normal flat punch or a ground-down 20-penny nail to drive the old primer out from the inside of the shell with a light blow from a mallet or hammer. Once the old primer is out, inspect the shell to ensure there are no cracks in either the brass or the plastic (if using a high-brass cartridge).

To seat the new primer, we need a box of 209 SG primers. These are readily available and come in packs of 100. Seat the primer the best you can by hand pressure ensuring the alignment is even going into the primer pocket. Now place the shell primer down on the flat metal surface of the anvil (a solid flat surface like metal is important). Take a common 5⁄16" deep well socket and a short adapter and place this over the primer pocket on the inside of the shell and again tap until the new primer seats. Simple enough. You now have a primed shell ready to load again.

Reloading the Shell

To load the shell we need powder (black or Pyrodex). The beauty of Pyrodex is overloading or overcharging is much harder, and Pyrodex powders are Walmart shelf items at about $12–$15 a pound. This should load 65–80 shells, depending on your load.

We will also need some wad and over wad/over shot carding. The wad can be any soft material. In the field, I prefer to use sheep's wool from my trapping supply kit, as it is somewhat lubricating as well as fire retardant after leaving the barrel of the gun.

To make our over wad/over shot carding we need a cutter. This cutter can be made from sharpened tube stock of steel with a ⅝" ID. Bevel the outer edges to create the cutting edge, then use this with a mallet to cut cardboard stock cards in circles.

Once we have these supplies we need to have a measure for powder and shot. This can be made from tubing as well. Mine is copper with one end smashed and a hole drilled for a lanyard. I can use this for both reloading and muzzle loading.

This measure should hold a particular volume of powder. About 60 grains is standard for the 12GA, and you can use this for an equal volume of shot.

The final step is using a glue gun to seal the top of the shell once loaded.

Talking Shot

Let's talk about shot for a moment. Remember we are measuring shot in volume, so the amount will vary with size. You can buy lead shot in bulk. The best all-round size for functional use is #6 shot, as it will kill birds, most small game, and will take medium animals as well, especially at close range.

The other kind of shot that is worth a look is actual BBs. They are very inexpensive as well as versatile and will be useful for about all game except small fowl. The only issue to remember with steel BBs is they cannot be melted down easily to make round ball or slugs.

Loading the Shot

There is an easy sequence to be used here every time to make a good shell. Set the primed cartridge on end and load a measure of powder, then a wad of wool (this amount will need to be figured as you make shells due to compression; the material is not easily measured for volume). Add an over wad card (cardboard cutout), then a volume of shot.

The final piece to add is an over shot card. At this point the shell should be filled to the top of where it was cut off (this is an adjustment to wad that you will always have to make when reloading a spent shell).

You can now seal the rim of the shell with hot glue to keep the contents in the shell, and you have a usable shotgun shell. Less is more on the hot glue; an electric melting gun makes the job easier than using a lighter to melt the glue stick, although the lighter will work in the field.

Round Ball

Let’s speak of round balls for a moment. If we are using a modified choke gun, it will have an ID at the end of the barrel. If it is approximately .071" or 71 caliber, I would suggest getting a lead ball mold of about .069". This will allow for a good, thick patch when muzzle loading and allow for wall thickness of the cartridge when reloading.

Shot is very difficult to reproduce, while round balls are easy. You will use much more shot for hunting than you will round balls, so carrying shot in volume and making a few round balls as needed makes more sense.

Muzzle Loading

Now let’s look at muzzle loading a single-shot shotgun. You will need a 209 primer adapter. Once you place this adapter in the breech of the gun,

it is basically a long shotgun shell. You replace the primer in the adapter and then load the gun from the end of the barrel instead of loading a shell.

The additional thing you need is a ramrod to pack the barrel contents, and you can do away with any over wad/over shot cards and just use wool.

To load the gun, replace the spent primer in the adapter and close the breech. Load a measure of powder down the barrel. Then push a wad of wool down the barrel against the powder with the ramrod.

Next add a volume of shot followed by another wad and you are ready to shoot. Pretty simple really.

If you want to use a round ball you have molded, the first steps are the same: prime, powder, wad. Once this is done you will need a patch. This can be made from a square of bed sheet material just large enough to wrap around the ball. This creates a seal when pushed into the barrel and seated above the wad and shot.

Tips and Tricks

- The versatility of this 12GA single-shot shotgun is truly amazing. As inexpensive as a used one is today, this makes it a vital piece of gear for any woodsman.
- A double-barrel break-open is a good option if you just think you must have a follow-up shot and the only main sacrifice there will be weight.
- My go-to company for subcaliber adapters is Short Lane Arms. Short Lane also makes a 209 shotgun primer adapter that makes your 12GA a muzzle loader if you choose. They also sell a retractable or breakdown ramrod that will fit in the haversack for use with the muzzle-loading system.
- For reloading shells, good quality high-brass shells will do better for this in the long run, or you can actually buy full brass 12 hulls online.

- Molds that will make a single round ball as well as ladles for melting lead shot over the fire can be purchased online from stores like Track of the Wolf.

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Chapter 13

Trapping: Beyond the Basics

"In all things of nature there is something of the marvelous."

—Aristotle

If you hope to catch some of your food, you should have a good working knowledge of traps for three main food sources: mammals, fish, and fowl.

One of the main concepts for longer-term living in the wild is that live food never spoils. For us it means that we are not forced to process the food straight away, only to care for it while we have it alive. This can be of big advantage in hot weather, but can also be troublesome if you're in an area with many large predatory animals. So a decision must be made. However for things like turtles and frogs, which can be kept in a sack or bag for a time, trapping is very advantageous.

Seasons and methods of take dictate what traps we can and cannot use as well as what species we can target. With traps being an indiscriminant means of catching prey we cannot control exactly what animal we catch; however, we can use traps sized, placed, and baited correctly for the target animal to reduce the risk of catching or killing a non-target animal. Check your local laws on what is to be done when a non-target animal is trapped.

Beginning with Bait Animals

The water's edge is the best place to secure meat sources the majority of the time. But first we have to realize that meat sources and trapping do not

always have to involve four-legged furry critters. Some of the easiest meat we can obtain is from animals that live the majority of their lives in or near water, like fish, turtles, frogs, snakes, and crayfish.

Seeking these items of food for ourselves and then delegating a portion of them to bait the traps we build will enable us to catch more sizable prey items. If we are in an area absent of these water sources we will need to micro-trap to secure things like mice, rats, and chipmunks to effect the same end results. We could also choose to combine both techniques to our end benefit. Some of these resources will be meals in themselves as larger fish and turtles will fit this category as well.

Catching animals lower on the food chain should be a priority even if you don't plan to eat them yourself. A baited trap has a much higher percentage chance of success than a blind set. If you work your way up the food chain, you will fill your belly as you go and improve the food you eat along the way.

Water-Based Traps

You'll want to learn how to make and set traps in water so that you can catch animals like fish, frogs, and turtles.

Nets

Net-making is a skill all by itself that can take a lot of time to master. However, there are easy ways of creating nets (although these are not as effective as methods that require true net-making skills). Any net will only catch fish or animals that cannot exit the holes you have created, so many nets have to be tailored to the intended prey. In a pinch you can use a T-shirt as a seining device.

Here are some common types of nets that can be used in water:

- **Dip nets.** These nets are usually attached to some sort of hooped pole that can be used to reach into the water and lift the target out while trapped in the net. This pole can be fashioned from a green fork that is wrapped against itself to form the loop. The net is attached directly to this hoop while being made. If you are carrying a large roll of tarred mariners' bank line, which I highly recommend, you can easily fashion dip nets with overhand knots on a main line. You can use dip nets to catch small turtles but larger turtles are hard to approach with them. Remember that most turtles that flip into the water during the day will swim under the log they were sunning on to seek cover. Dip nets are also useful for frogging and for catching crayfish. See Figure 13.1.

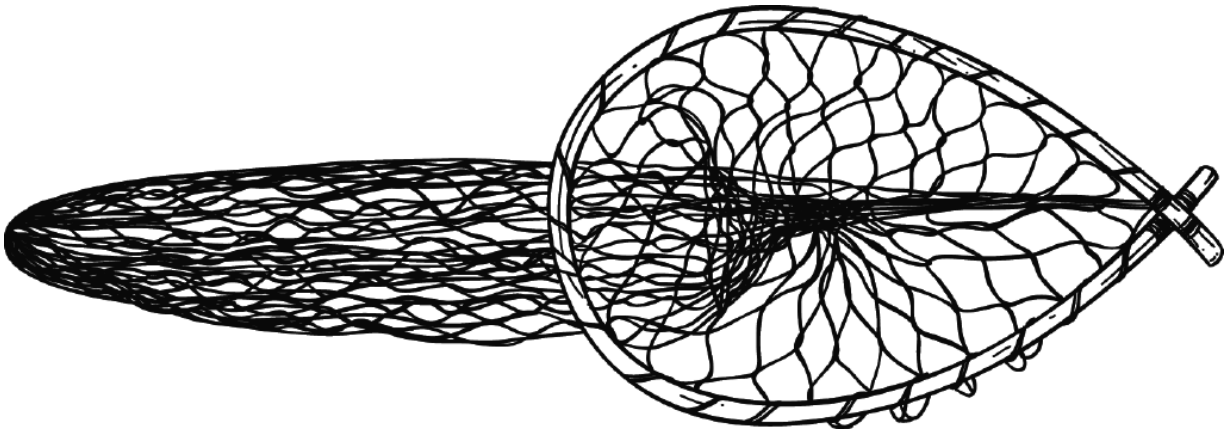

Figure 13.1 Dip net

- **Gill nets/stop nets.** This type net must be made long enough and deep enough to be stretched from one side of a creek or small river to the other and go from the top of the water to the bottom. It is usually weighted with stones at the bottom and has some type of floatation at the top or possibly a sapling running the length of the span. You drive fish into this net by walking downstream, chasing the fish into the net where they get hung in the holes as their gills pass through but body

cannot. As with other nets, you will need to know the average size of the fish you're trapping to make an effective net. Dip nets and fishing traps tend to be a better use of cordage than a gill net/stop net. See Figure 13.2.

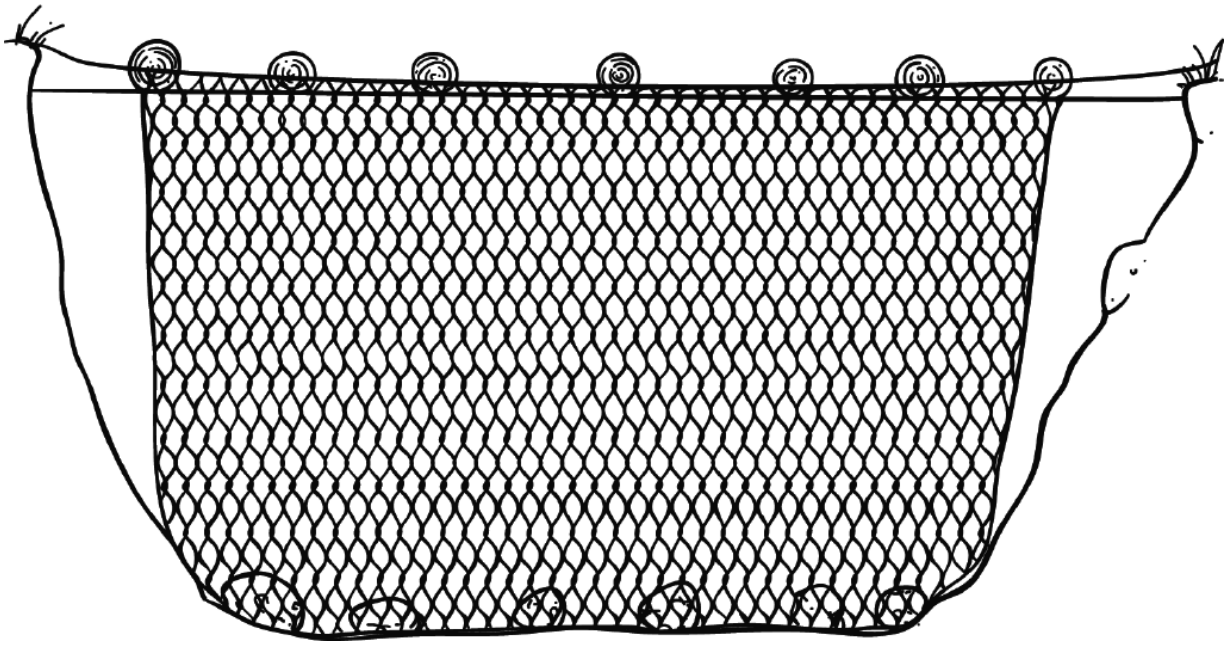

Figure 13.2 Gill net

- **Seine nets.** These are fairly large nets with very small holes that are walked through a deeper water source. They are used to manipulate smaller fish to the edge of the water to scoop them out. See Figure 13.3.

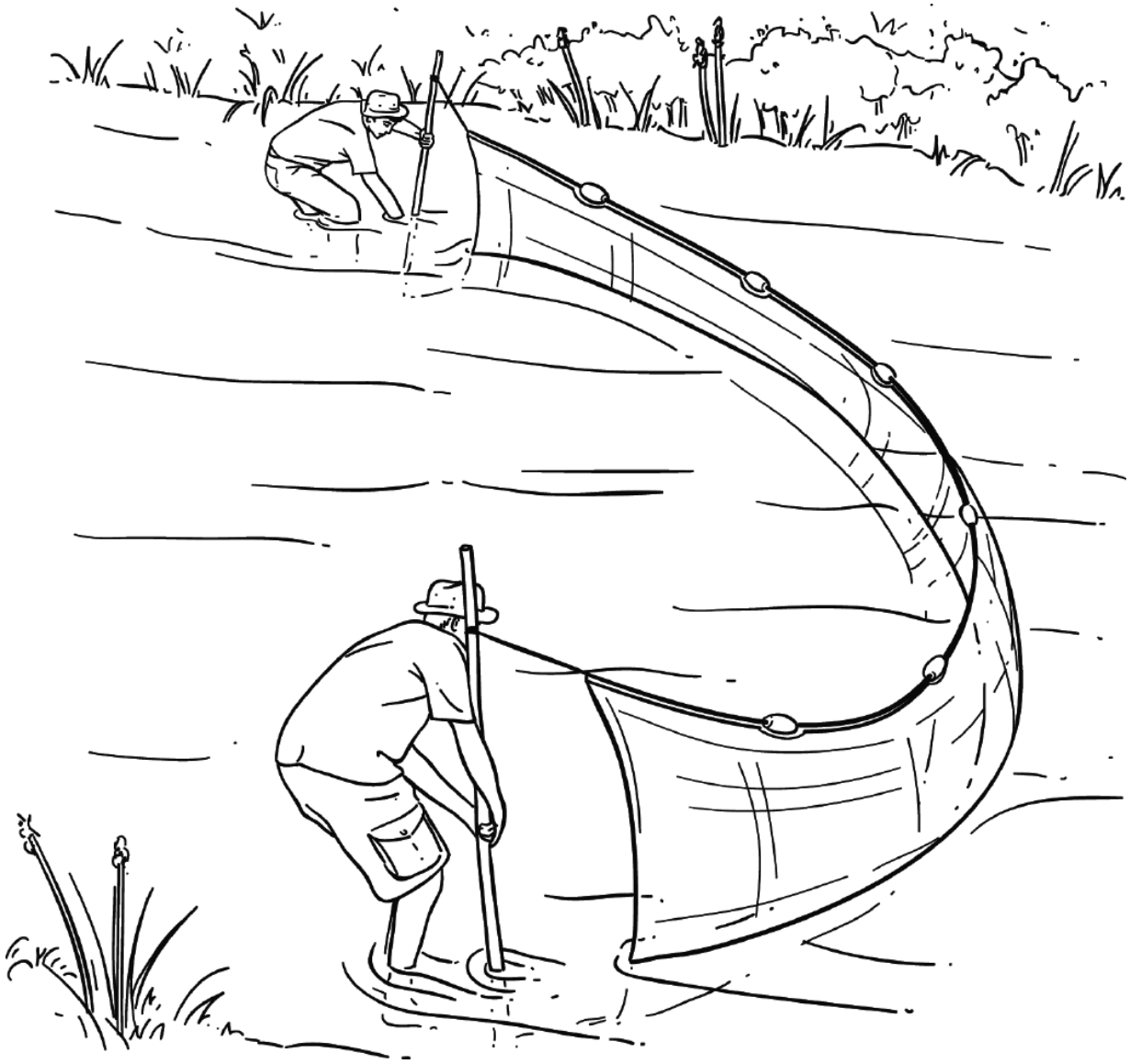

Figure 13.3 Seine net

- **Funnel nets.** These nets resemble dip nets in many ways and can be made in small diameter and elongated for fish-type traps or can be made in large diameter and laid flat to trap animals when the net is lifted. See Figure 13.4.

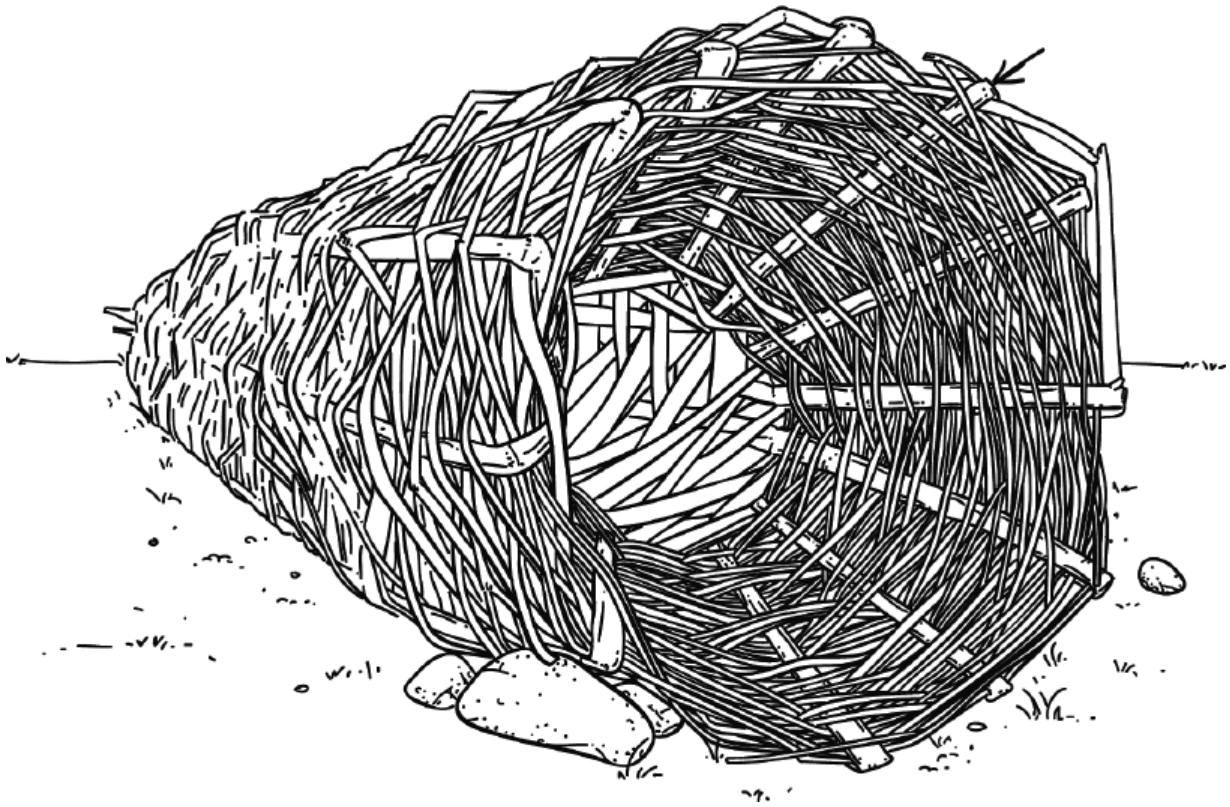

Figure 13.4 Funnel trap

Fish Fences

Fish fences can be used to either guide fish to a certain location in the water or placed on the water's edge for other types of animals like turtles. They can be built from any natural material including stones, sticks, or even logs. Fencing called a weir can be used to trap fish in a smaller area where you can hunt them with a bow or gig. An M-shaped bank trap allows a turtle to climb onto the bank for bait but will not allow it to return to the water. This is a good trap for overnight while you are asleep. See Figure 13.5.

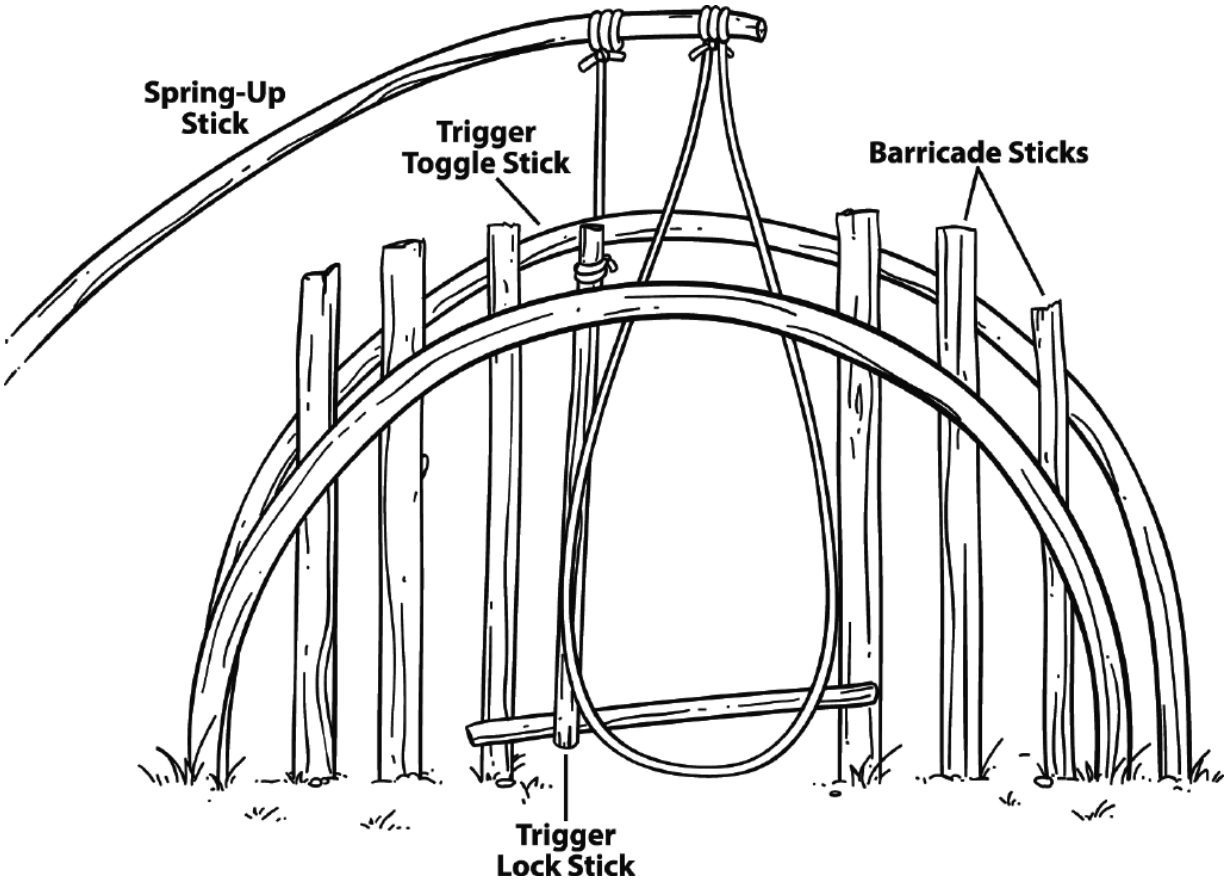

Figure 13.5 Fish fence

Basket Funnels

Basket funnels are traps woven from natural materials employing two cones that fit together so that fish can swim in, yet they cannot swim out.

These are woven in the same fashion as a basket. The inner cone has a hole in the bottom that fish can swim into, thus entering the closed larger cone, which traps them inside. See Figure 13.6.

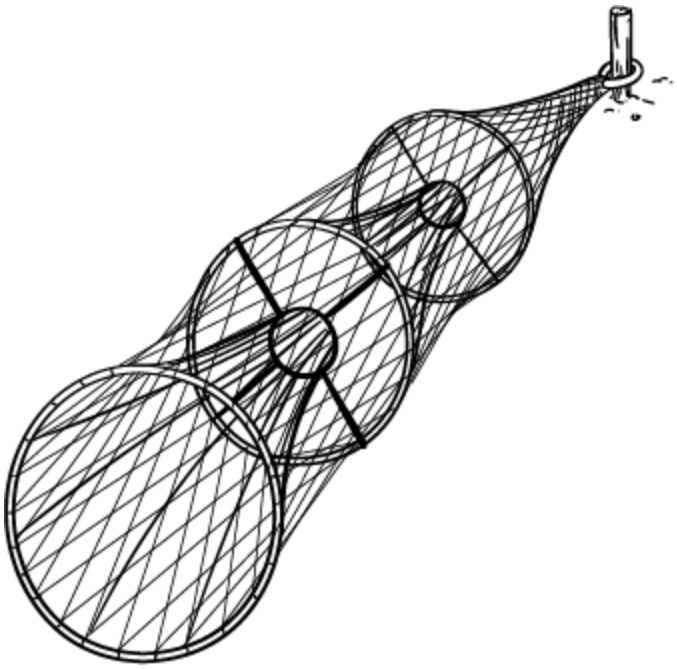

Figure 13.6 Basket funnel

Tube Trap

You can make a simple tube trap from any pop can by placing skewers into the can at an inward angle. These allow the animal in to eat the bait—but not back out again. See Figure 13.7.

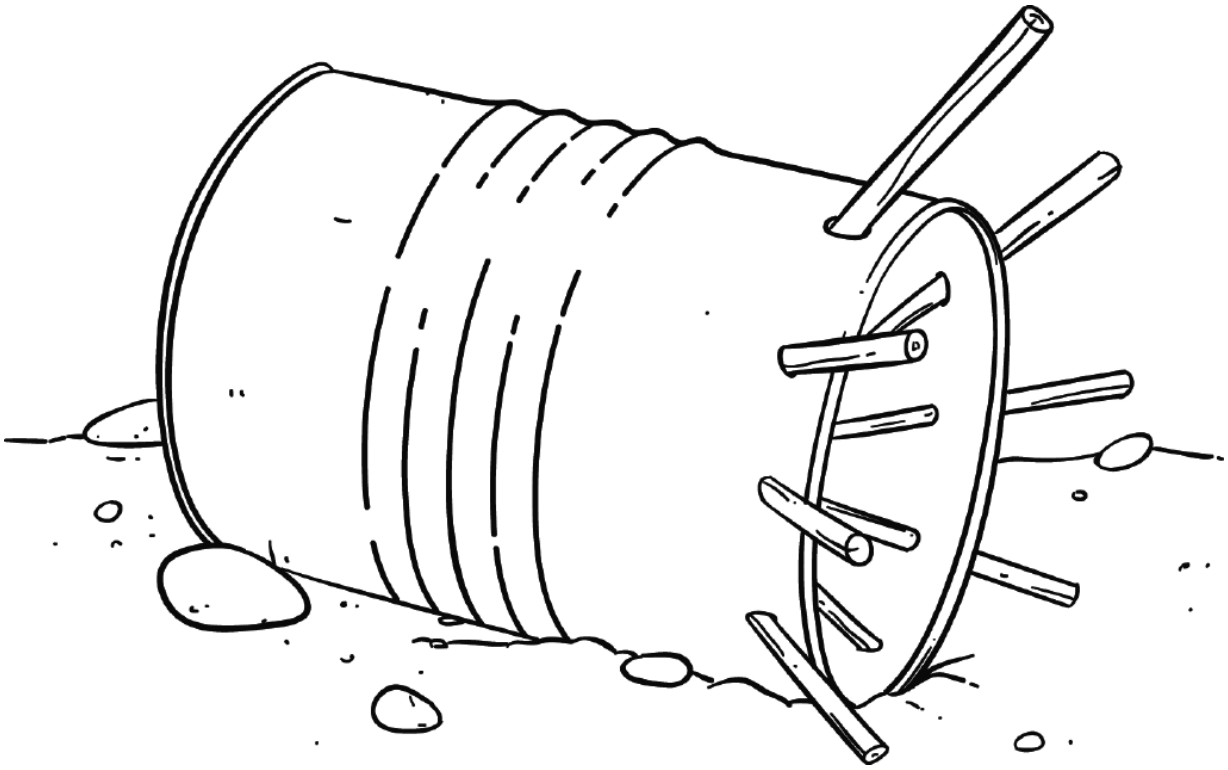

Figure 13.7 Tube trap

Bushcraft Tip

Some type of alarm system like an old can filled with rocks is a good addition for any trap that will catch an animal live.

Snares

Fish can be caught with a snare-type device by using an available hook, bent safety pin, or carved gorge-type hook. Bait is easy enough to obtain; turn over logs until you find worms or grubs. You can also rig a trigger system so that the rod does not have to be attended. A simple hook with any red fabric chard will attract frogs to a hook and line.

Lines with L7 Triggers

This is a form of fishing that employs line and trap together to set the hook after the animal runs with the bait. An L7 trigger (a type of quick-release system made with simple reverse notches, described in the section in trigger traps later in this chapter) is combined with a spring pole device, allowing the line to be hand cast off the bank with a baited hook of some sort. When the fish or turtle runs with the bait it dislodges the L7 trigger and springs the pole, which immediately jerks the line to set or lodge the hook in the throat of the prey. This trigger system can also be used to catch turtles. See Figure 13.8.

Figure 13.8 Trigger

Once you've secured one or more of the lower-food-chain meat sources (the things other mammals eat), you can use the leftover material for baiting traps to capture larger animals.

Primitive Traps

Primitive traps are designed to accomplish one or more of three things: strangle, mangle, or dangle. With that said, we need to look at the differing types of traps because many of the same releases or triggering systems can be employed with many different setups to accomplish the end goal.

Deadfall Traps

These traps are often what you think of when you think of a primitive trap. They are generally designed to drop a large, heavy weight onto an animal, crushing it or trapping it beneath the weight of the deadfall. Small mammals such as mice, rats, chipmunks, and ground squirrels are about the largest animals that can easily be taken by deadfall traps. These animals are usually too small to set off more complicated spring-type traps (discussed in the following section).

Many people, unfortunately, set deadfalls incorrectly. There are many factors we must first realize about these traps to use them effectively. Deadfall traps are not always intended to instantly kill prey. Smaller deadfalls for micro-trapping of rodent species will many times suffocate the animal. Misunderstanding this point is what causes so many people to raise a deadfall like a rock or log at a high angle to achieve this crushing power. The fact is that the higher the angle of the deadfall, the more chance the

animal has to escape the trap. Placing the bait as far to the back of the trap as possible will decrease the margin of error.

There are several different types of traps that use weight to kill or trap an animal:

- **Leaning deadfalls.** These traps generally employ a heavy object leaning at one end on the ground with the weight of the leaning object held up by a trigger that releases the weight of the deadfall. There are two simple rules of thumb when using these leaning deadfall devices. The first is that deadfalls should be five times heavier than the weight of the animal to be trapped, and the second is that the deadfall should never be at an angle greater than 30° from the ground. See Figure 13.9.

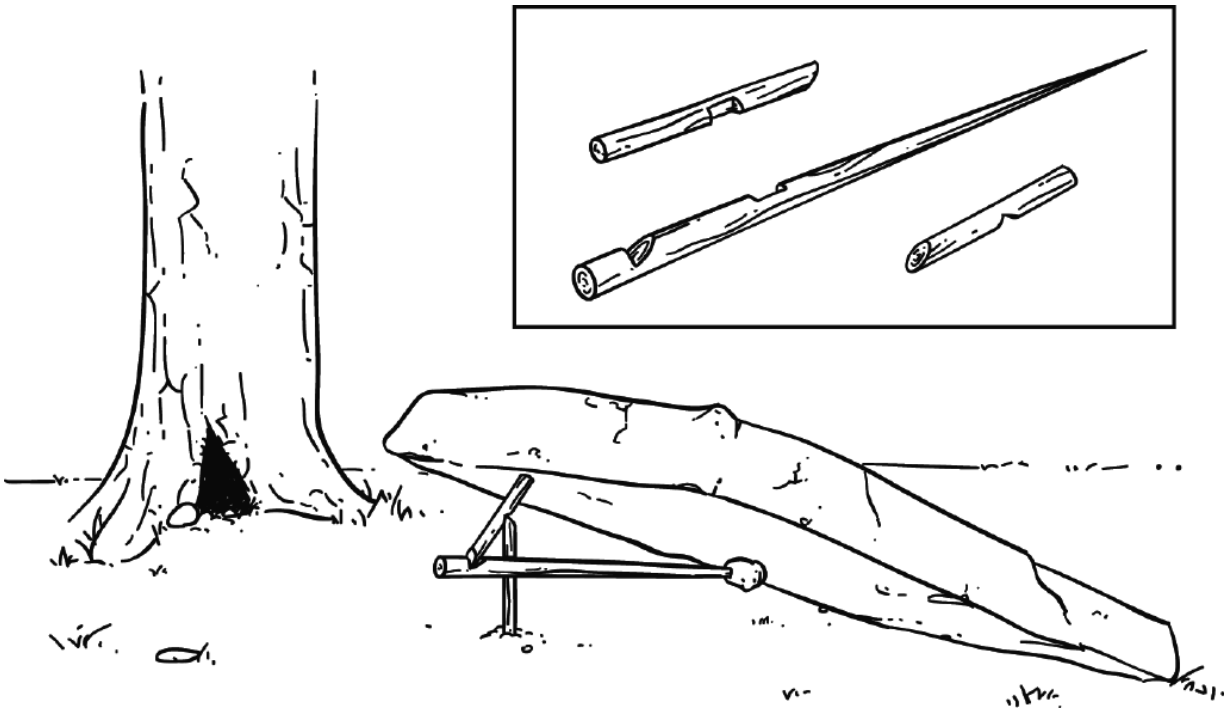

Figure 13.9 Leaning deadfall trap

- **Suspended deadfalls.** These traps involve a device suspended above the ground that drops upon release. These can also be combined with

some type of spikes or spear points for larger game. See Figure 13.10.

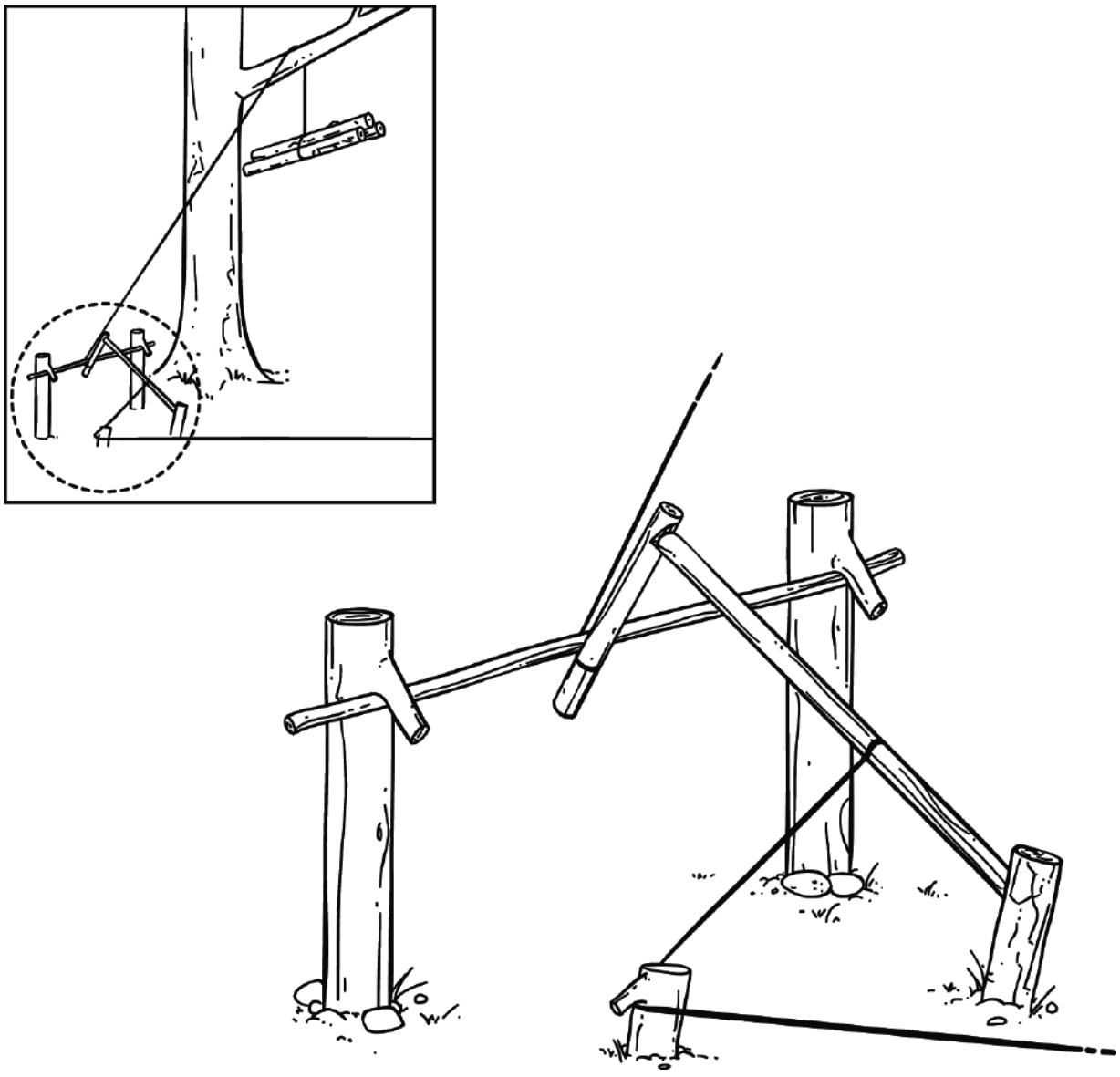

Figure 13.10 Suspended deadfall trap

- **Windlass machine traps.** These traps involve a windlass machine (a type of winch) that delivers a killing blow or deploys a spike or spear to impale the animal upon release of the trigger. See Figure 13.11.

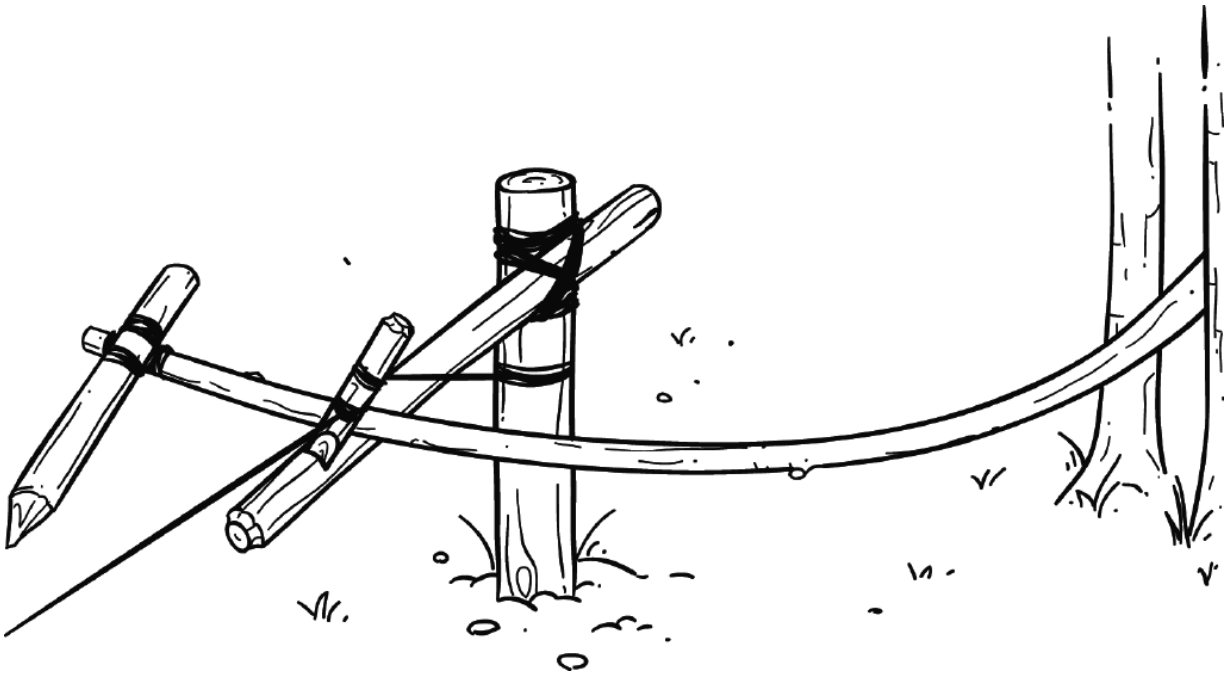

Figure 13.11 Windlass machine trap

Snares

A snare is a noose made of rope or wire that loops around an animal and pulls tight, catching it. Most snares will not catch the animal around the neck as you would hope. Body catches will happen more often than not. Snare loops need to be set at a targeted diameter to ensure a proper catch. A snare set a bit larger than an opossum's head will most likely never catch a coyote. This is another reason paying attention to animal sign is important. Only a baited and triggered snare should be set off trail (otherwise you are unlikely to catch anything), so this is an important consideration as well.

Medium-sized mammals like opossum and raccoon are about the largest animals you will want to tackle in a short-term situation since they can be processed and consumed easily without having a lot of meat lying around camp, something that will attract predatory or scavenging mammals. When trapping larger animals, set traps just off the trail going to or from a

water source so that a non-target larger animal like a deer does not trip over and set off your trap unnecessarily. See Figure 13.12.

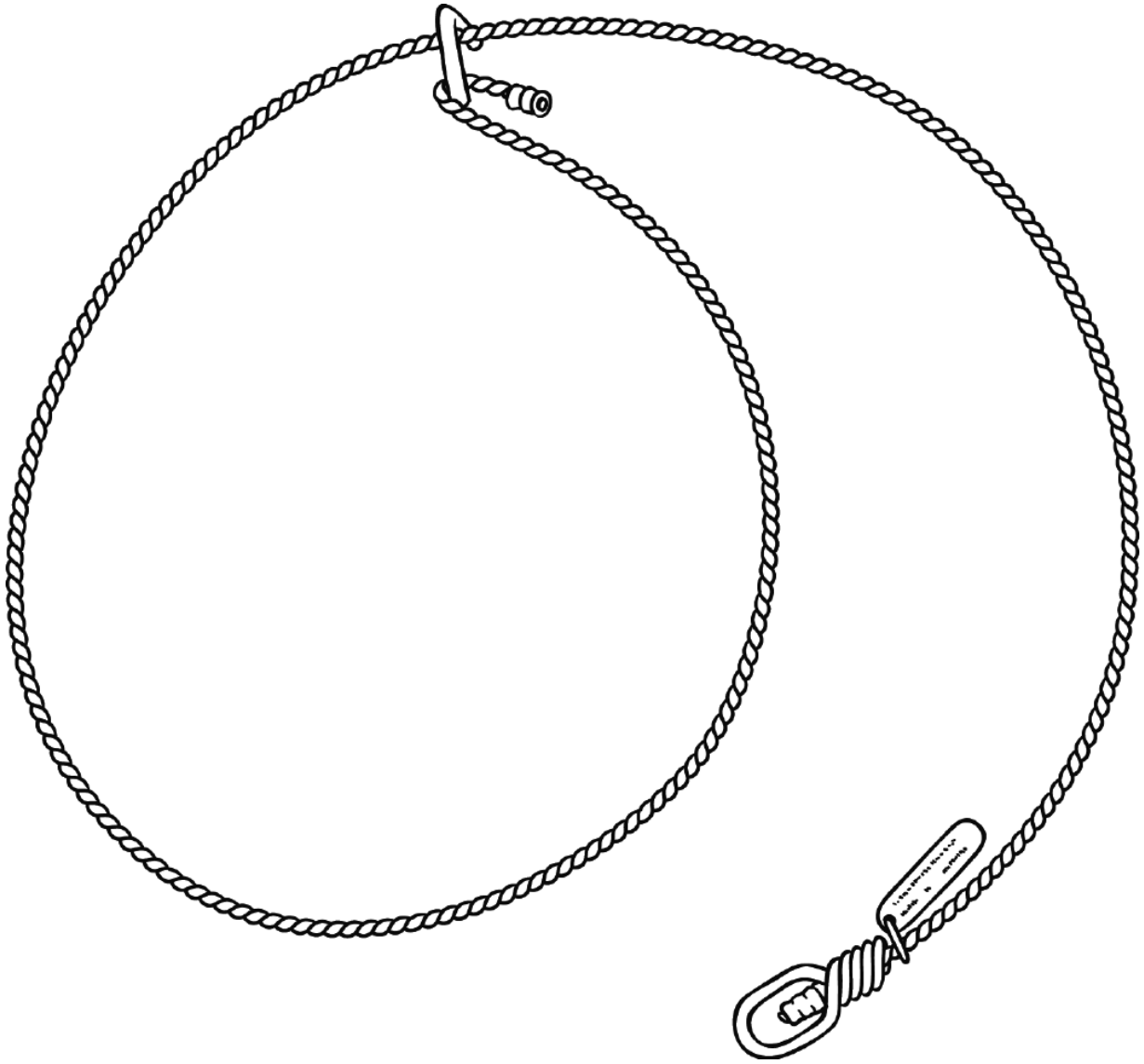

Figure 13.12 Snare

- **Free-hanging snares.** These are also call blind snares. They are unpowered snares that rely strictly on the animal's momentum or its fighting the trap to tighten and hold the creature. These are the least effective traps when done in primitive fashion; however, cable snares can be very effective. They can be set in small-game trails and should

be suspended bearing in mind the animal's height at the head when walking. We always strive for a neck catch when snaring. For opossum or raccoon, if you can place your balled fist under the snare, that will be pretty close to head height. You want the opening of the snare for these animals to be about half again larger than your fist.

- **Powered snares.** Snares involving a spring-loaded engine or a counterweight device can be very effective depending on setup as long as they lift the animal off the ground. Remember, an animal will do what it has to for escape if it is alive and chewing is a natural act! If it is on the ground, it has lots of opportunity to chew its way free. (For this reason, trappers sometimes use wire or cable snares.) Spring-loaded snares should always be alarmed for immediate reaction to reduce the suffering of the animal as well as to prevent its escape from the trap. All spring snares will require an engine or catalyst to make the snare close around the animal. Many things can be used for this, from a simple bent sapling to a counterweight device such as a log. Items from your kit can also make great engines, including bungee cords or sling-shot-type latex bands.

Trap Triggers

Trap triggers come in a variety of configurations. The main thing to remember is that triggers, like traps, must match the size of the quarry. Triggers for rodents cannot be made from 2" branches that the animal does not have the strength to pull down or manipulate to set off the trap. While there are many styles of these spring-type traps, I find the simpler the design and the simpler the trigger, the better. A pressure-release toggle can be adapted to several applications, and the majority of components can easily be carved in camp. In an extreme emergency, the toggle-type traps

can be constructed with no tools at all. See Figures 13.13A, 13.13B, and 13.13C.

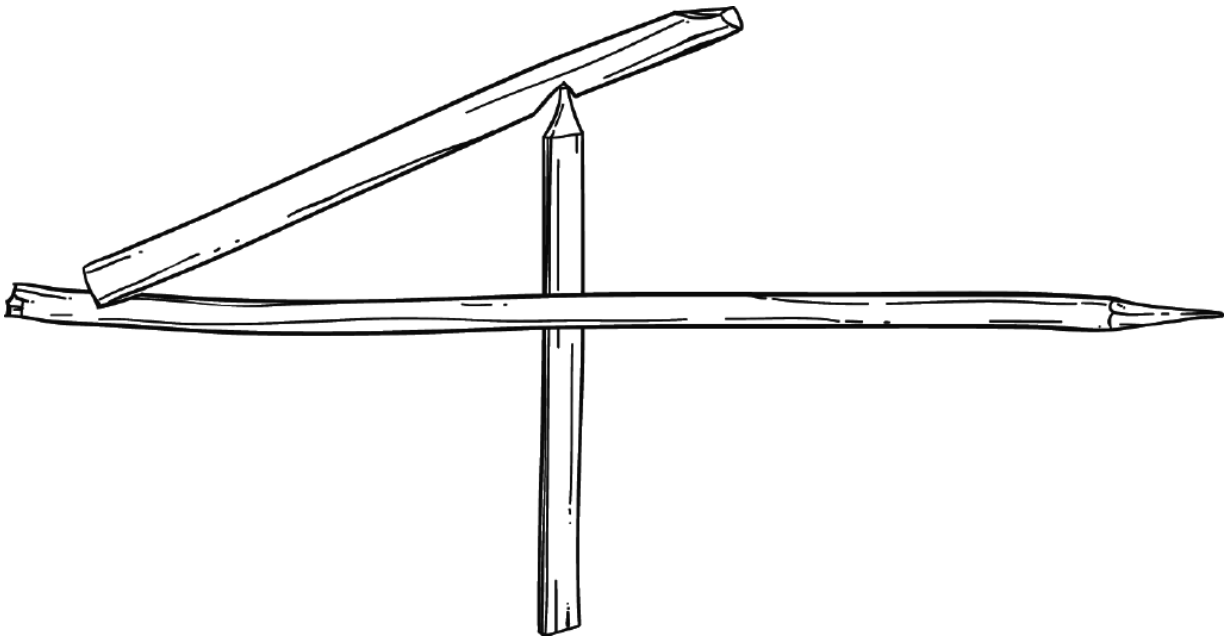

Figure 13.13A Figure 4 trigger

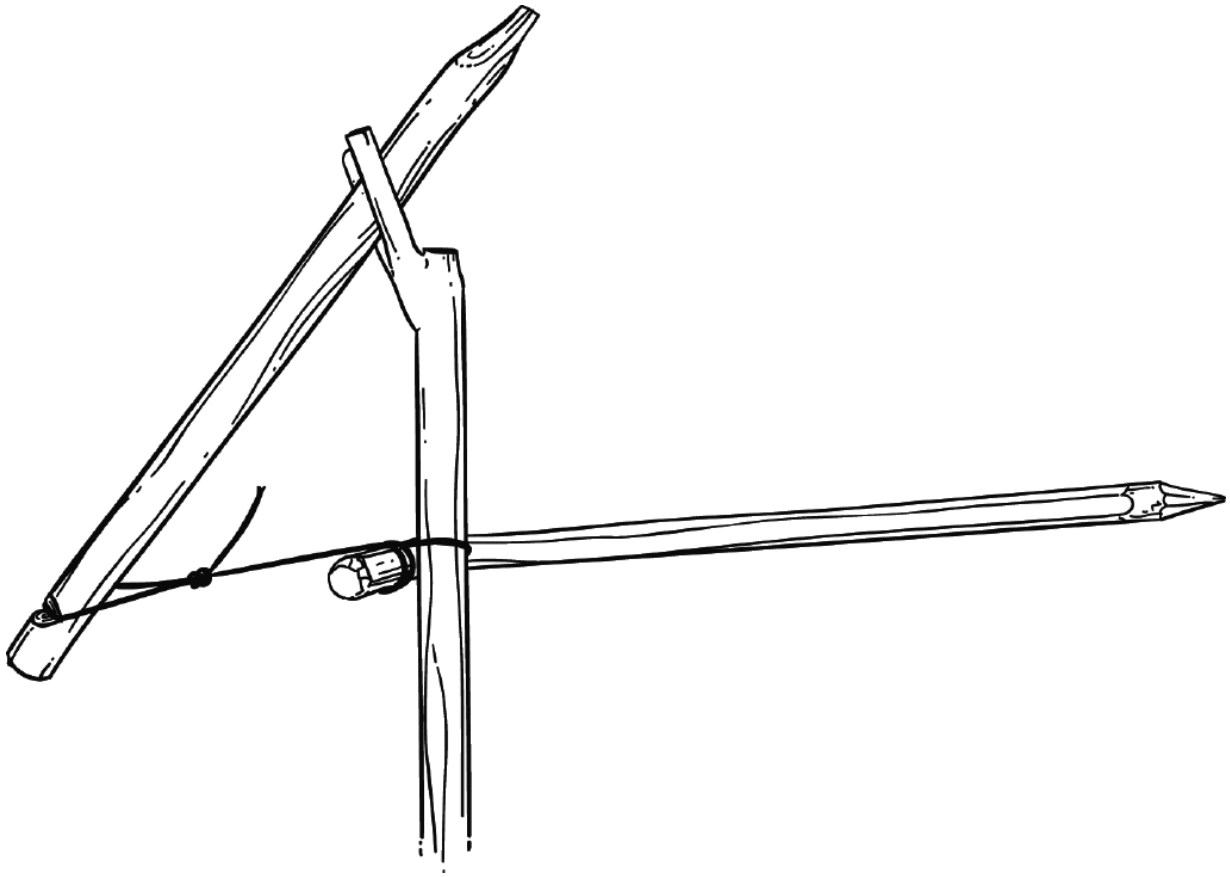

Figure 13.13B Piute trigger

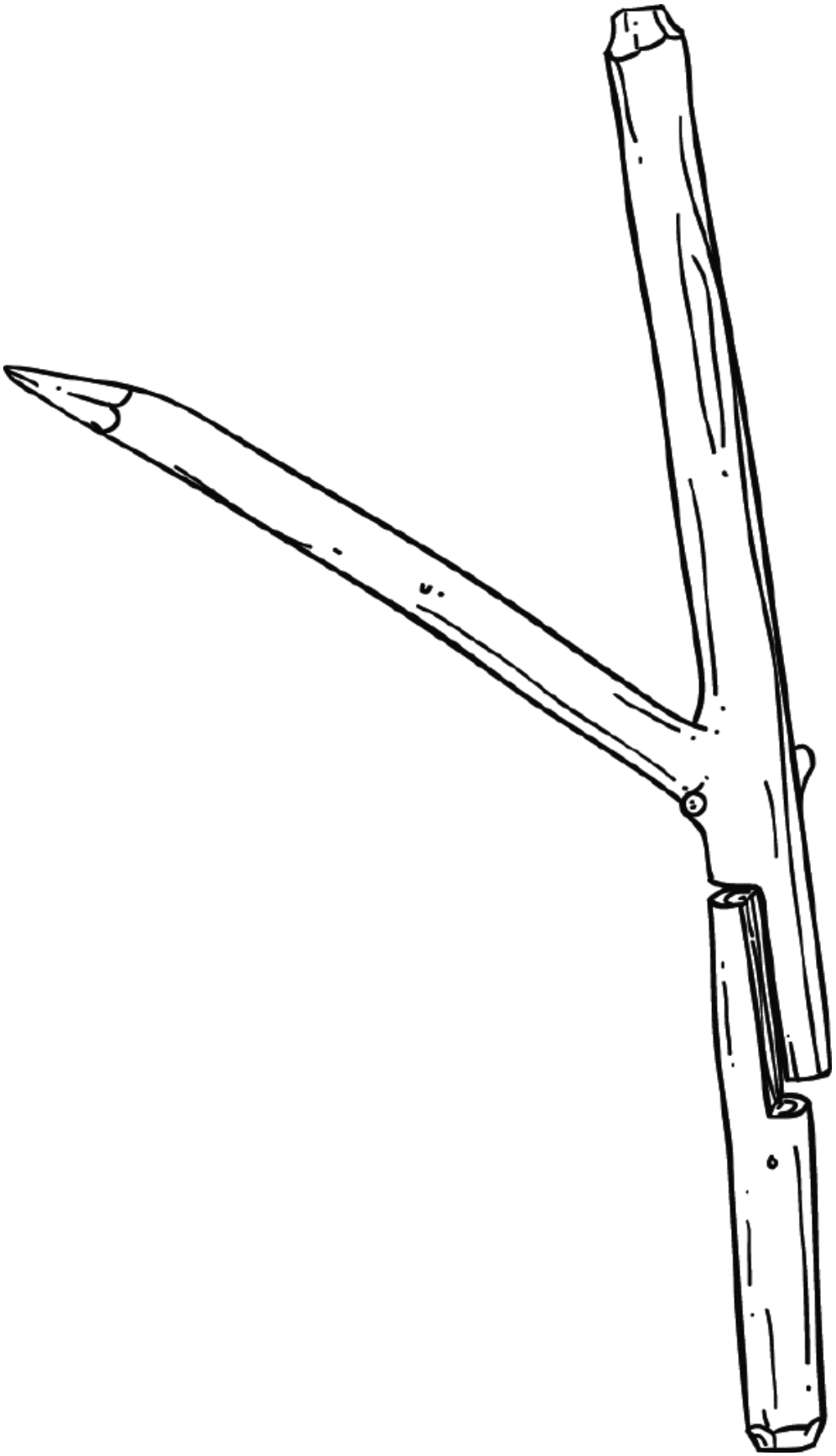

Figure 13.13C Split trigger

Trapping Birds

All North American birds are edible. Because of this—as well as the sheer number of them—birds can be a good choice to add to the table. Birds, especially small birds, should be trapped in an open clearing where the visibility of bait is optimal. Most of the time bright-colored berries or fruit will be most attractive to birds as bait. Remember to alarm the trap if possible, as the bird will be captured alive. There are three traps that work the best in my opinion.

Multiple Ground Snares

One of the most effective traps for small-seed-feeding birds is a simple stake in the ground surrounded by a small pile of ground debris with small-diameter snares attached that overlap to create a network of ground snares. Bait them with something the birds are feeding on. Two main considerations here are:

1. The size of snare material should be very fine line.
2. You need many snares—at least 25 for a 2-square-foot area with 2–3" overlapping loops. See Figure 13.14.

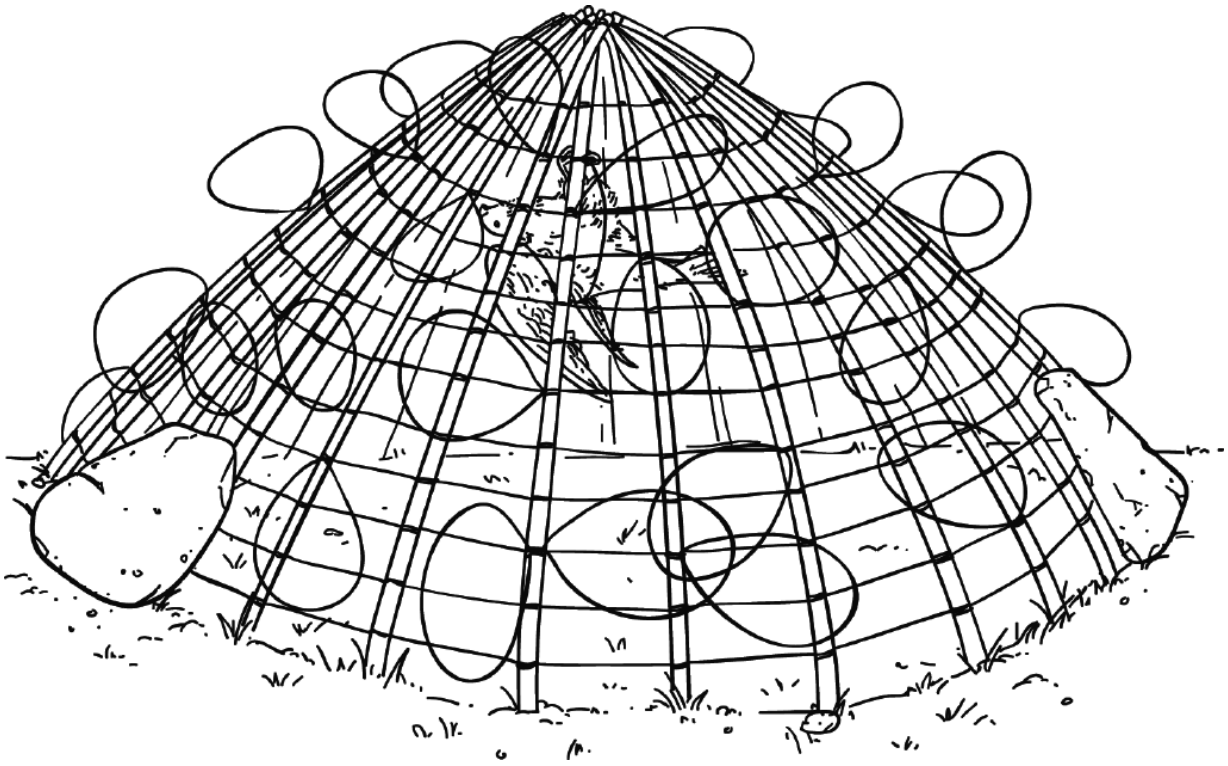

Figure 13.14 Multiple ground snares

Ojibwa Bird Trap

This trap uses a perch for the bird to land. The weight of the bird on the perch drops a counterweight that, when released, activates the snare, which in turn traps the bird by its feet. This device works well as the bird will grab the stick when landing, ensuring its legs are inside the snare (which lies over the perching stick). The big trick to this snare is to make sure that the closed snare is drawn close to the hole in the upright pole so that the bird is held tight and close in an upside-down position. See Figure 13.15.

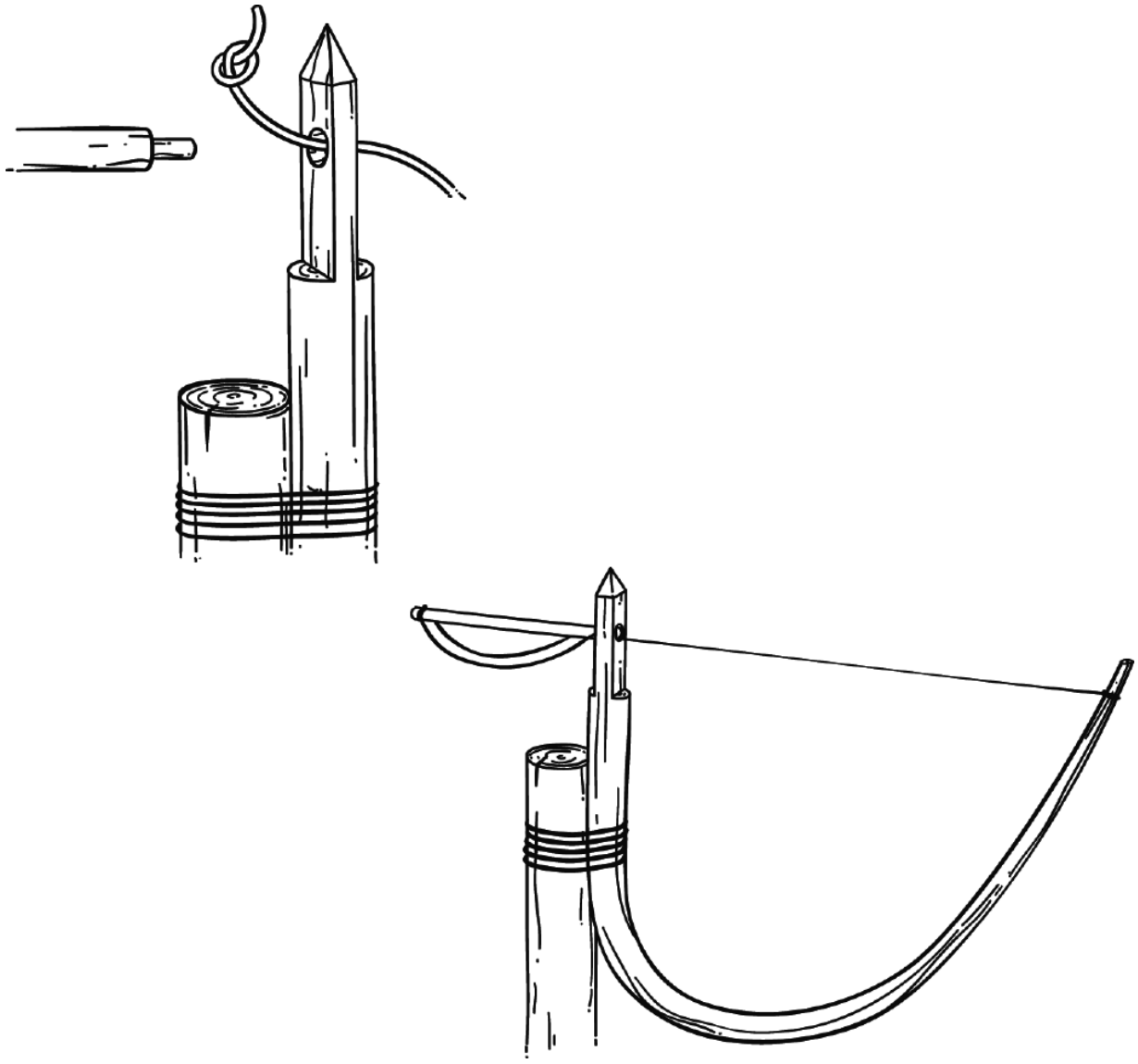

Figure 13.15 Ojibwa bird trap

Cage-Style Traps

Cage-style traps for smaller birds are easily built by making an X with a length of cord across two sticks, then filling in with progressively shorter lengths of cord in log-cabin fashion. Small tripping lines work well connected to a step or breakaway trigger so that birds attempt to hop or duck the strings to get to seed bait in the center of the trap. This trap can catch up to ten birds in an hour in the right conditions. See Figure 13.16.

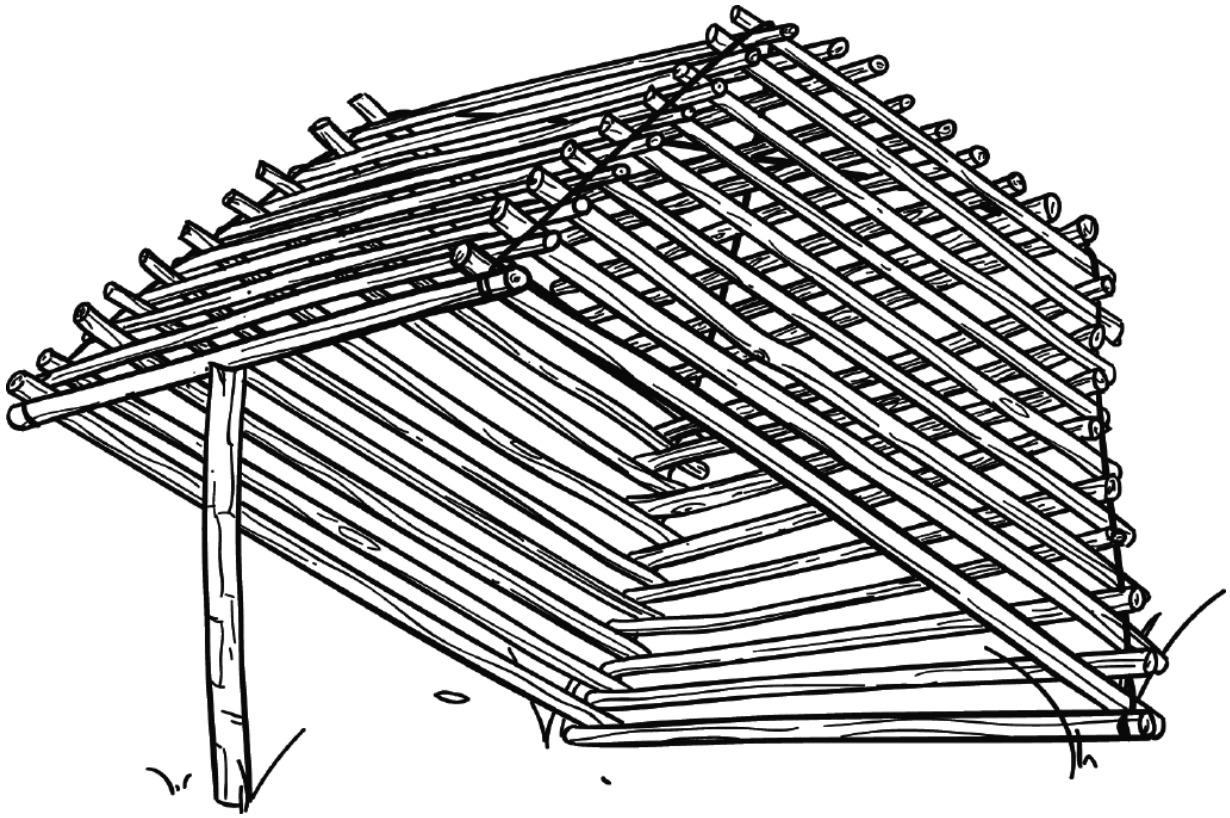

Figure 13.16 Cage trap

You can also take a larger bird with a net, especially at night. During nesting season, most waterbirds like geese or ducks will defend their nest to the point of becoming very vulnerable to dispatch. This gives you the opportunity for eggs as well.

Eating Animals Found Dead

Okay, so what about animals we find already dead? A free meal, right? Maybe. There are several things you must consider before digging in. First, realize that heat is the enemy of any fresh meat even if the animal was healthy when it died, so the longer it has been dead the more you should think before eating. However, you can put a lot of trust in your own nose. We can tell when something smells off. When it does, stay clear of it.

With fish the best indicator is the gills. If they are still pink, the meat should be okay. Once they turn white, don’t consume it, even if it’s well cooked.

What about mammals? I have a personal policy that unless it is an extreme emergency I will not eat any mammal I did not see expire. This allows me to evaluate the way it died or was killed as well as the condition that animal may have been in before expiring. It may have died from a disease. Some diseases are transmittable to humans, and you want to avoid them. If the animal is not acting according to normal behavior, there is usually a reason for it. For example, raccoons are nocturnal animals. To see one wandering around during the heat of the day is an automatic red flag to me.

If you must eat an animal you find dead, there are some things to take note of to determine how long it has been dead as well. However, there are no guarantees.

- If the animal is bloated badly, it has likely been there a while and is no good.
- If there are still fleas on the carcass, it has not been dead long as these will be the first to abandon a dead host.
- If the eyes are still wet or glossy, this is a good indicator of an animal that has died recently.
- If there are maggots on the body, this is a sign it has been dead too long.
- If you decide to clean and eat the animal, look at the internal organs for bright rich coloring. If the liver has any spots on it or there are lumps visible on the organs, abandon that desire to eat and move on.

One thing to remember about a road-killed animal is there's a good chance the internal organs were damaged, including the bladder, which may taint any interior meats as well.

Recipes for Trapped Game

The following are some of my favorite recipes to use for trapped game.

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Fried Potatoes and Squirrel

Boiling the squirrel the night before reduces the amount of time it takes to make this meal.

1 squirrel, skinned and gutted
½ teaspoon Old Bay Seasoning or garlic powder
2 medium russet potatoes
1 onion
Bacon grease or lard for pan frying

1. Boil squirrel in pot the night before. The meat is ready when it is falling from the bone. Drain and debone. Store the meat in a cool place, away from scavengers or predators.
2. The next day, shred the squirrel meat and mix with Old Bay Seasoning.
3. Boil potatoes for approximately 15 minutes, then slice. Dice the onion.
4. Grease a pan with bacon grease or lard and heat over medium heat. Add onion, potatoes, and squirrel meat to the pan and fry until the meat is heated through and the potatoes are golden brown. Serve.

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Dutch Oven Raccoon Roast

This is a great meal to start in the morning and then enjoy for an evening meal.

3–4 pounds fresh raccoon meat, cut into chunks
4–6 tablespoons cooking oil
1 beef bouillon cube or 2 teaspoons beef bouillon powder
1 cup hot water
3 medium potatoes, quartered
3 medium carrots, peeled and cut into 1½" pieces
2 medium onions, quartered
Old Bay Seasoning or other seasoning to taste

1. In a Dutch oven over hot coals, braise raccoon meat in oil. Dissolve bouillon in hot water to make broth.
2. Once the raccoon meat is browned, add vegetables, broth, and seasonings.
3. Cover and cook over medium heat 3–5 hours or until meat reaches desired level of doneness.

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Rabbit Stew

This is a good stew recipe that can work with most types of game.

1 large rabbit or 2 young ones, butchered into 8 pieces
6 pieces salt-cured bacon, cut up
4 large carrots, peeled and cut into chunks
8 red potatoes, quartered
2 cloves garlic, minced
½ cup apple cider vinegar
1 medium onion, diced
2 tablespoons butter
3 tablespoons all-purpose flour
2 teaspoons salt
2 teaspoons ground black pepper

Place rabbit in stew pot and cover with water. Bring to a boil and boil for about 5 minutes. Add all ingredients along with enough water to cover the meat in the pot. Slow cook over medium heat 1 hour. Serve with bread or biscuits.

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Opossum Roast

As with any roast, baste this one frequently with drippings to retain moistness.

1 small opossum, cleaned and quartered
1 teaspoon salt
2 tablespoons lemon juice
1 teaspoon ground black pepper
1 teaspoon Old Bay Seasoning
Dash Cholula Hot Sauce
1 tablespoon Worcestershire sauce

1. Place opossum in a Dutch oven. Mix remaining ingredients into a paste and spread over the opossum.
2. Roast using medium heat 30 minutes per pound, usually about 2–3 hours. Baste frequently with drippings. Serve with drop biscuits.

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Opossum Cracklings

This works best with a winter opossum, as it will have more fat. Be careful not to overheat or burn as this will impart a bad flavor.

1 opossum

1. Remove fat from the opossum. Use the meat in another recipe.
2. Place fat in a skillet and render by cooking on medium heat.
3. Pour off the liquid and save for lard. The hard brown bits leftover are cracklings. They eat well when salted or seasoned with Old Bay.

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Glazed Pheasant

This recipe can work for a larger bird.

2 pheasants
¼ cup salt
1 box wild rice stuffing mixture (12 ounces), prepared according to package directions
1 jar raspberry preserves (about 12 ounces)
½ cup water

1. Remove feathers from birds. Rinse birds, remove giblets, and pat dry. Sprinkle cavity with salt, and stuff with dressing. Tie legs together with string and arrange in a Dutch oven. Bake 1½–2 hours or until tender.
2. Mix preserves and water in a pan and bring to boil. During the last ½ hour of baking, baste the birds frequently with the preserve mixture. Remove strings before serving with remaining preserves.

Tips and Tricks

- Frogs are fairly easy to stun with any flexible stick if hunted at night with a headlight to freeze them in place. This technique will work whether the frog is on land or in water.
- Snakes will be found in the water or on the edge, especially at night when frogs are present. They can be dispatched just like a frog with a nice flexible stick. Or, you can pin them down with a Y-shaped branch

and dispatch them with a rock. However, trapping a snake is tough, as they are masters of escape.

- Alarming of any trap possible is important.
- The location of traps is also important. Try to keep all traps within a 50–100-yard perimeter of your camp so you can easily get to them in the middle of the night if you catch something. Scavenger animals such as opossums and raccoons are not shy of humans for long, and scent control is not a worry with them.
- Travel routes are excellent places for traps. Prey can often be lured to a baited trap as most are opportunistic in nature.
- You may at some time capture a non-target animal. If it is a large animal, it will most likely escape without your help. If it is a skunk, you are one step away from a few days of good stink, but so goes life in an emergency scenario. Just do your best to free the animal and watch its back end!

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Chapter 14

Butchering Game

"Cook ingredients that you are used to cooking by other techniques, such as fish, chicken, or hamburgers. In other words be comfortable with the ingredients you are using."

—Bobby Flay

Understanding the basic principles behind cleaning and butchering is an important aspect of cooking. This process can have a positive or negative effect on not only taste but also the freshness of the meat you intend to cook.

It is fair enough to say that any animal killed should have the guts removed at the soonest opportunity as heat is a bacteria-growing paradise. Once an animal is dead, the quality of the meat decreases exponentially without proper care.

Conditions of the Kill

To start, we should think about temperature when we harvest game. Refrigerators are designed to preserve food, and they are set at around 38–40ºF in most cases. So, logically if we harvest meat in a temperature warmer than this we need some urgency in the processing to keep the food in good condition.

There are many mitigating factors to the condition even of freshly killed meat. These include the animal's health, time of year, age and sex of

animal, as well as the timeliness of its death. If an animal runs hard or is scared just prior to dying and its adrenaline is flowing, the meat will not be as good as meat of an animal killed instantly in a calm state. These are all things to consider when taking game.

An animal killed quickly (whether by trapping or hunting) should provide very good-quality meat if it is recovered in good time.

Fish don’t present the same worries. Fighting a fish to land it does not affect its quality. Just process it quickly after the catch.

Butchering Tools

Tools of the butcher are as diverse as for a professional of any kind. However, you need not worry too much about this for camp meat as you will not be doing the detail of the processing butchers do to sell select cuts of meat. You will need certain tools, but most of these you will have already in your kit if you are camping anyway.

Knife

A good sharp knife of a butchering style with a 5" blade will handle up to the largest game. A fillet knife is handy if fish will be on the menu. A pocketknife with a smaller blade will help in the process but is not a necessity for down-and-dirty processing of meat for the fire. Ulu-type blades, which are crescent shaped, are used in many countries and are a handy camp kitchen tool, though not crucial to the process. A large cleaver is convenient if you have a mind to carry one but a good hatchet will work as well.

Axe

A camp hatchet or axe will suffice for lots of quickly needed tasks like foot and head removal and can also aid in further bone cutting and skinning if needed. Keep your axe as sharp as your knife. A hunter’s-style axe has a rounded pole on the back to aid in pushing between the hide and the carcass on larger animals.

Bushcraft Tip

If you are carrying a large blade such as a machete-type tool, this can easily replace the axe for most chores that require one.

Shears

Again this may be something already in your kit, but a good set of heavy sewing shears can come in right handy at times when processing fowl. Shears make quick work of opening a body cavity on small game and are also of good use on fowl with hollow bones that are easily clipped to separate the pieces, like wings from the carcass or discards like feet.

Saw

A good saw is an asset to any camp, but the blade choice and type of saw is important for this task. A good bone-cutting blade is expensive, but if you carry a cheap 12" bucking saw with a metal tubular frame, you can buy equally inexpensive hacksaw blades that make great bone-cutting blades. So this can be another item in camp that works for more than one chore.

Gambrel/Meat Hook

Some type of gambrel or at least a meat hook will be needed to raise the animal high enough off the ground to make the job of butchering easy and to keep the carcass out of the dirt. For larger animals, you may need a come-along or winch. Simple block-and-tackle systems are easy enough to craft in a pinch with minimal equipment. You need a rope, something to act as the axle (such as a sturdy tree branch—still attached to the tree), and something to tie the rope to once the load has been lifted.

Safety Concerns

Any time you're handling an animal carcass it's a good idea to wear some sort of disposable gloves to protect against bacteria entering cuts and scratches on your hands while working with raw meat.

- **Meat freshness.** As far as the freshness of meat, you should trust your nose a lot. If you have questions, give it a smell. If in doubt, don't eat it.
- **Aging meat.** Aging the meat—the process of holding meat at a temperature of 34–40ºF for 7–10 days—breaks down proteins and can make game meats a bit more palatable and tender. However, it is not a very easy or exact science in camp. Better to just cook it and deal with possible toughness by the way it is prepared. If you are in the woods to eat wild meat, fresh is the best and safest eating for my money.

Processing Considerations

For larger game animals that may hang for a day or two in camp while being processed slowly for camp meals, the skin should be left on the carcass after gutting and only removed when being processed. This will keep the meat from drying out and help keep any possible bugs off the

surface. However, this is only a good practice in cooler temps—remember the refrigerator conversation. Small game can be processed and cooked immediately as the cooked meat will be less likely to spoil after cooking.

Meat can also be kept cool by placing the processed cuts into a plastic watertight bag, removing as much air as possible and storing it in the creek (depending on water temperature), held down by rocks or logs, and tied to a limb or root so it doesn't wash away.

Bushcraft Tip

For any mammal, the true key is keeping the meat from being contaminated after the kill. Urine, feces, or other liquids contained within the lower digestive organs should never come in contact with the meat or it can change the taste dramatically.

The Butchering Process

In larger animals like deer, as soon as the animal is dead, you should put on your gloves, place the animal on its side, take your knife and cut deep around the anus, and on a doe the vulva, then pull this material out and tie it off with a cord or zip tie to prevent contamination.

While gutting take great care not to perforate the lower organs with your knife.

Once this is done roll the deer onto its back with the rear end facing downhill if possible and insert your knife into the body of the deer just below the breastbone, at an angle toward the neck so that you don't puncture the stomach, and open an air gap in the body cavity.

Once this hole is created, withdraw the knife and insert your fingers in a V to guide the knife in cutting shallowly in the other direction all the way to the pelvis.

You can remove the external male organs at this point. You can also remove the internal organs, cutting away any connective tissue from the body cavity, and any leftover material in the pelvis area. Then hang the deer for further processing.

Small Mammals

With any other mammal, the process is much the same with less mess and work as they get smaller. Remove head and feet, then gut the animal. Small game such as rabbit and squirrel can be skinned without hanging easy enough by making a cut through the fur across the backbone and pulling by hand in opposite directions.

Small Game Birds

Small game birds are easy enough to breast by standing the bird on the wings, keeping your feet close to the body of the bird, then bending over and pulling up on the feet. This will separate the carcass and expose the breast meat.

Larger Game Birds

Larger birds like turkey and duck are treated a bit differently. Gut them by cutting just below the breastbone and slicing all the way down to the anus, then removing the innards. As with mammals, be careful not to cut into the intestines. If you want to remove the feathers before eating, do so soon after harvesting and before beginning the butchering.

Tips and Tricks

- I use some type of food-grade oil on my tools all the time in case I am going to process food with them. The oil protects the tools from rust; using food-grade oil means I won't ingest anything toxic. In salt-water environments stainless steel is best but I find carbon much easier to maintain in the field.
- The task of skinning and processing meat requires sharp tools, so an assortment of sharpening aids, like a diamond rod, steel, and carborundum for the axe, will be very useful.
- When breaking down an animal, use the anatomical lines already in place to guide your knife. Cut along muscle groups (instead of through them) and between bones instead of trying to hack your way through.
- Remember that any items left from the butchering that you are not using can become bait for other meals and traps, as well as an attractant for hunting later.
- Be careful to avoid cross-contamination when butchering raw meat. When possible, use dedicated tools for the job, and clean your tools carefully before using them for other processes.

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Chapter 15

Catching Fish and Frogs

“Fishing is much more than fish. It is the great occasion when we may return to the fine simplicity of our forefathers.”

—Herbert Hoover

Fish, frogs, and crayfish are probably the easiest meat sources of high quality to secure in the wild from most areas. Rod and reel are often carried by campers. I would also suggest a frog gig if you plan to secure camp meat even when the fish may not be biting.

Fishing Equipment

Equipment for fishing can be as simple as a hand line or as complicated as the most expensive and modern rod/reel combo. However, there are some real nice packages for packable rods and reels that can be found fairly inexpensively. A light-action rod will work for most around-the-camp fishing from shore and something of less than 6' will do fine.

Tests of line should probably range from 4–6 pounds so that they are durable yet strong in case you are fishing for bluegill and happen to hook a lurking bass in the shallows.

Bushcraft Tip

To make a bottle trap to catch bait, cut off the shoulders and neck of a plastic bottle (any size) and invert it so that the cut ends come together, creating a funnel. You can sew the pieces together with fishing line or tape the edges together with duct tape if you're worried they'll come apart. Weight the bottle with a few stones, add some bait (such as insects), and place it in shallow water. Secure it into position with more fishing line. Once fish swim in, they won't be able to swim out again and you can use them as bait for larger, more desirable fish.

For tackle, keep it simple. Live bait can often be found near shore and captured with a dip net or bottle trap, so hooks and weights (sinkers) are about all you need with a couple of floats or strike indicators.

In all the fishing I have done around the eastern woodland areas the most productive artificial bait I have found is a simple inline spinner such as a Mepps or Rooster Tail. They are attractive to almost all species of pan and game fish and they are an easy lure to use. Just cast and reel, varying the speed and the depth till you find the fish.

Choose a few standard colors, like yellow, white, and chartreuse green, in about ⅛ ounce, plus something that looks very natural as well like a brown or dark red. This should serve you well.

Frog and Fish Kit

A simple kit made from any cylindrical object, be it a soda can or PVC tube, will increase your odds greatly and add a new dimension to your fun

in the outdoors. This kit is created using an 8" piece of ¾" PVC with an end plug glued into one side and a removable cap at the other. All components can be stored inside the tube when not in use.

In the cap, drill a hole large enough to secure a wrist loop of paracord. On the outside, I recommend about 50 yards of 50-pound spider wire. This fishing line is small enough in diameter to secure small fish but also heavy enough for the occasional big boy you may hook.

I recommend the following: 5 #6 hooks and 5 #8 hooks, several split shot, and a couple of small bobbers. I also carry about 12" of red yarn; frogs can’t resist this wrapped around a hook and dangled in front of them. Remember that big hooks catch big fish but small

hooks catch a lot of fish!

With this kit, you gain a lot of confidence very quickly.

Preparing Frogs and Fish

Frogs are fairly simple to prepare. We will only consume the back legs in most cases and these can easily be cut free at the uppermost joint from the carcass. Once the legs are removed, the skin is easily peeled off and the legs are ready for cooking.

Breaded Frog Skewers

This is one of my favorite ways to fix frog—and it's quick and easy.

4–5 frogs, fresh caught
1 box hush puppy mix (about 10 ounces), prepared according to package directions
Hot sauce, to taste

1. Cut frogs at the hind quarters and roll in hush puppy mix. Skewer with a green stick and cook over medium coals till golden brown, about 10 minutes.
2. Shake a bit of Louisiana or Cholula Hot sauce on the frog legs as you eat, discarding the bones.

Filleting or prepping fish can be done in several ways. The simplest is to cut the fish from vent through the gills and remove everything inside to include the gills. The fish can then be cooked or further prepared by either beheading or filleting or both.

To fillet the fish is to remove the most usable meat and discard the rest. Make a cut the width of the fish just on the outside of the gill plate on both sides of the fish. Then take the tip of a sharp knife and working on either side of the backbone begin to cut along the top of the ribs. Once this meat is freed it will still be connected at the tail and you can flip the entire slab over and use a long flexible blade to cut between the meat and the skin so that you are left with only a slab of fresh fish with no bones or skin. This is called the fillet. See Figure 15.1.

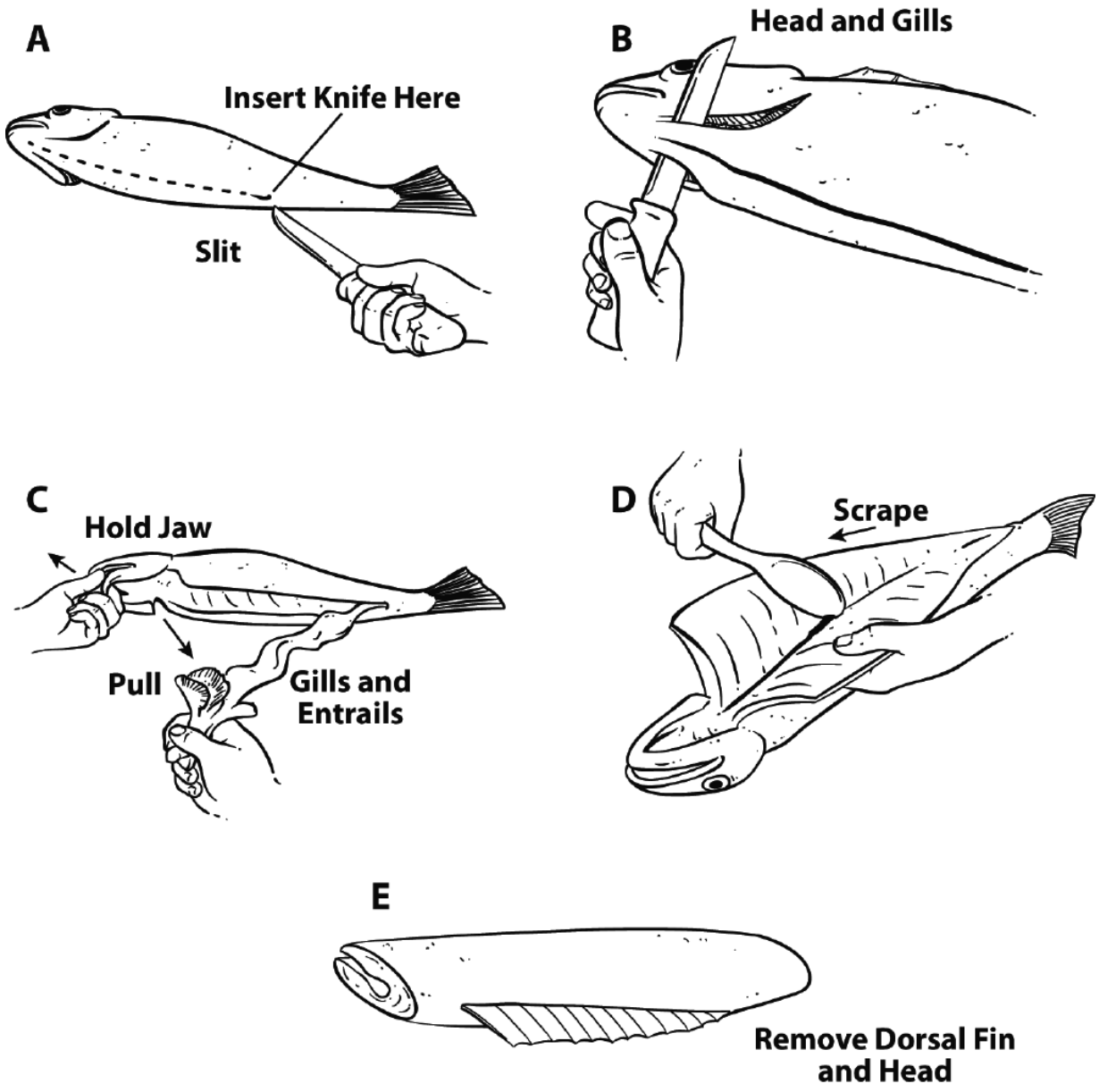

Figure 15.1 How to clean fish

Lots of fish are easily cooked whole after removing the gills and cuts, and the meat can then be picked from the carcass with a fork to avoid the bones. Fish cooked in foil over coals will separate very well from the skin, and this locks in all of the flavor as well.

Tips and Tricks

- The thing with many fishing lures is they seem to catch a lot more people than they do fish. Limit yourself to just a few types that will cover multiple water depths and retrieve speeds, and have confidence you will catch fish. To me, confidence is more important than any lure you use.
- Use your ears. You can often hear frogs before you see them.
- Keep frogs and fish alive so you don't have to immediately process them. A 5-gallon bucket with a lid, filled with water, will hold them until you can get to them. Cut air holes in the lid.
- Patience and persistence are key in both frogging and fishing. If you're not successful on a first pass, you might be successful on a second.
- Make sure before setting out that you check local laws and regulations as well as acquire any necessary licenses or permissions.

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Chapter 16

Dave’s Favorite Recipes

“Fat gives things flavor.”

—Julia Child

In this chapter, I’m sharing my favorite campfire cooking recipes with you.

Old Reliables

These recipes have stood the test of time.

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Survival Bread

This no-frills bread will fill you up if you run low on other food supplies.

3 cups all-purpose flour
1 teaspoon salt
1 package (¼ ounce) active dry yeast
2¼ cups water
Small amount of fat, such as lard or vegetable oil

1. Mix together the dry ingredients. Warm the water to about 110ºF (too hot or too cold and the yeast won't activate). If you don't have a thermometer, water of this temperature is about what you'd want for a nice warm shower—not too hot, not too cold.
2. Slowly add water to dry ingredients while mixing to form a dough consistency. Cover with a rag and let stand in a warm place for 24 hours (90–100°F). Dough should double in size.
3. Working on a floured board, knead about 6–8 times. Grease the dough with lard or vegetable oil and shape into a loaf. Cut a cross in the top of the loaf and let stand for about 1 hour.
4. If cooking in a Dutch oven, use fewer bottom coals and double on the top of the lid. Rotate the lid about every 5 minutes and cook 20 minutes on medium heat. You can also cook in a loaf pan or other type of cooking pot, but use a lid, or form a lid from aluminum foil, to help trap the heat and cook the bread thoroughly. It's done when it makes a hollow sound when tapped on the top.

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Cat Head Biscuits

These drop biscuits are as big as a cat's head—thus their name. For kids, a fun variation on this recipe is to form the dough around the end of a stick and cook it over the campfire, then pull it off and eat.

3 cups all-purpose flour
4 teaspoons baking powder
1 teaspoon salt
¼ teaspoon baking soda
1 cup lard (or butter or shortening)
1 cup buttermilk

1. Mix dry ingredients together. Cut in lard and add buttermilk.
2. Mix to a formable dough and knead 8 times on a floured board. Roll out or flatten by hand so dough is about 1" thick.
3. Cut out biscuits by hand or use an opened can to cut them out. Biscuits should be about 3–4" in diameter.
4. Cook in a greased Dutch oven about 20 minutes.
5. To make buttermilk, add 1 tablespoon lemon juice or vinegar to 1 cup milk and stir.

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Mountain Man Breakfast

For those mornings when you've got a big appetite!

4 large russet potatoes (any kind will do), cut into chunks
½ tube of sausage such as Jimmy Dean Premium Pork Sausage or 8 ounces sausage, sliced or crumbled
6 eggs
½ pound medium Cheddar cheese, grated

1. In a Dutch oven, boil potatoes until partially cooked, about 10–15 minutes.
2. While potatoes are boiling, cook sausage in a skillet until cooked through, about 8–10 minutes. Remove sausage from skillet and set aside.
3. Add eggs to sausage fat in skillet and scramble.
4. Drain potatoes. Add eggs and sausage to potatoes in Dutch oven. Add cheese. Cover and cook 20 minutes on medium heat.

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Scotch Eggs

This hearty meal doesn't have to be for breakfast!

4 large hard-boiled eggs, shells removed
1 pound ground sausage, any kind
1¼ cups corn flour, wheat flour, or bread crumbs
Salt, ground black pepper, and other seasonings of choice to taste
2 fresh eggs
2–3 cups oil (your choice) for frying

1. Dry hard-boiled eggs with a towel or rag. Pat sausage into thin patties and wrap each egg completely.
2. Mix together flour and seasonings in a shallow dish.
3. Break the fresh eggs into another shallow dish and scramble well.
4. Dip sausage-egg roll in egg and then roll in breading mix.
5. Fry in oil in a Dutch oven until golden brown, about 5 minutes, turning halfway through. Serve.

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Sausage Nuggets

Serve with pan-fried hash browns for a hearty meal.

1 pound ground sausage, any type
1 pound sharp Cheddar cheese, grated
3 cups Bisquick
½ teaspoon Old Bay Seasoning

Mix together all ingredients and roll into small balls, about black walnut size. Cook in a greased Dutch oven 10–15 minutes or until done (no pink in center).

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9-Bean Soup

If you purchase dried beans without seasoning, add 2–3 teaspoons Old Bay Seasoning to the pot.

1 bag mixed soup beans with seasoning (about 20 ounces)
1 pound salt-cured bacon, diced

1. Add beans to Dutch oven and cover with water. Bring to a boil over medium or medium-high coals. Boil 10 minutes.
2. Add bacon. Boil an additional 10 minutes, then move to low-heat part of fire and cook 1 hour.

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Hobo Stew

This traditional campfire favorite uses up all your leftovers so you don't have to pack them out. I generally make this in a bush pot for myself.

Leftover meat
1–2 large potatoes
2–3 tablespoons dried vegetables or leftover vegetables
Old Bay Seasoning or your preference, to taste

1. In a Dutch oven or bush pot, cook whatever meat is left over in camp by boiling until tender.
2. Add more liquid after boiling to raise pot back to ¾ full. Add potatoes and vegetables.
3. Cook until all contents are heated through and water is reduced to about ¼ of the pot, about 30 minutes. You can add instant potatoes for a thickener if the stew is thin. Season to taste and serve.

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Camp Jambalaya

As long as you don't tell them in New Orleans, you can use any seafood for this jambalaya.

1 package ground sausage (about 16 ounces)
8–12 fresh crawfish (tail meat only)
1 bag precooked rice (8–9 ounces), (I like Uncle Ben's Butter & Garlic Ready Rice)
2 medium onions, diced
3 green bell peppers, seeded and diced
2 tablespoons Old Bay Seasoning
¼ teaspoon cayenne pepper
½ cup water

Brown sausage in a Dutch oven. Add remaining ingredients and simmer 30 minutes or until rice is cooked through. Serve.

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Bread Pudding

This Bread Pudding goes great with Camp Jambalaya.

8 slices stale bread
2 eggs or powdered equivalent
¼ teaspoon salt
2 cups milk
¼ cup butter
½ cup granulated sugar
2 teaspoons ground cinnamon or nutmeg
½ cup fresh raspberries
Topping of your choice—cinnamon, brown sugar, or molasses

1. Cut bread into small cubes and set aside. In a small bowl, beat eggs and salt together and set aside.
2. Place milk and butter in a 2-quart saucepan and heat until scalded.
3. In a large bowl, add bread, sugar, cinnamon, and egg mixture. Slowly add milk and butter mixture. Stir until bread is well soaked. Stir in raspberries.
4. Pour mixture into a small Dutch oven or pot and bake 30–45 minutes or until golden brown on top and heated all the way through. Top with cinnamon, brown sugar, or molasses and serve.

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Raspberry Cobbler

S’mores aren’t the only way to satisfy your sweet tooth at a campfire!

¼ cup butter, melted
¾ cup all-purpose flour
¾ cup granulated sugar
¾ cup milk
2 cups fresh raspberries (any fruit will work for this; if using canned fruit, strain first)

Mix all ingredients except fruit into a batter. Pour batter into a Dutch oven. Scatter in the fruit. Cook 1 hour over medium heat or until bubbling.

Quick Favorites

These recipes cook up fast—but they’re still full of flavor.

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Pigs in a Blanket

Use a stick to cook these just like marshmallows over the fire.

8–10 link sausages or 3–4 hot dogs or 1 kielbasa sausage, cut into 4 pieces
1 package quick 3-cheese biscuit mix (about 7½ ounces), prepared according to package directions

1. Boil sausage or hot dogs in water 6–10 minutes, until cooked through. Remove from water and pat dry.
2. Roll the prepared dough into a rectangle and cut into strips about 1" wide. Wrap the dough around the sausages like a ribbon spiraling the sausage.
3. Place on a stick and cook over medium coals for 5 minutes, turning constantly. Eat right off the stick or dip in a ranch dressing.

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Sausage Kabobs

For a different flavor, try adding pineapple chunks to the kabob.

3–4 smoked sausage links, cut into 2" slices
4 new red potatoes, quartered
1 green bell pepper, seeded and sliced

Thread sausage, potatoes, and peppers onto skewers or a stick, alternating ingredients. Cook over medium coals until sausage and potatoes are cooked well.

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Tinfoil Trout

This dish can work for any fish. Substitute ramps for the onion if you prefer.

1 fresh-caught trout
1 medium onion, sliced
3 tablespoons butter, sliced
Garlic, salt, and ground black pepper to taste

1. After gutting the trout, lay on heavy foil with enough on all sides to completely fold over the fish. Place onions, butter, garlic, salt, and pepper in cavity. Fold foil over and crimp shut so juices don't escape.
2. Cook on top of coal bed about 10 minutes, turning once. When done skin should peel off easy and meat should fall off the bone.

Marci's Best

A very good friend of mine, Marci Waleff, is a Viking re-enactor (she goes by the name Mistress Marsi of Hadley) and a great outdoor cook. She generously shared some of her best outdoor cooking recipes with us.

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Farmer Cheese

This simple cheese recipe is a fun camp activity. Reserve the whey produced in this recipe for other uses.

1 gallon whole milk (not ultrapasteurized)
½ cup vinegar
Sea salt or smoked salt to taste

1. Set up your workstation with a cheesecloth or linen cloth in your whey-catching bucket.
2. Heat milk over the fire to the boiling point. Remove from fire as soon as it boils.
3. Quickly add vinegar and stir. You will see the milk curdle and the solids separate from the liquid.
4. At the workstation, lift the curds into the cheese cloth. I use a simple linen cloth or large cotton flour sack material. Once you have lifted the curds that will come out in a solid form, pour the remainder of the material slowly into your cloth-lined bucket. You may squeeze unwanted whey from the cloth or leave it to hang for an hour or so.
5. Add sea salt to taste and enjoy.

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Marsi’s Oatcake

This should keep for several weeks just wrapped in linen cloth provided you have used quality dried ingredients. If you use fresh fruit in lieu of dried fruit, your mix will be more moist; therefore, you should eat the oatcake within a week or so. As this ages it dries out, so it is a great traveler’s companion.

¼ cup honey
½ cup lard or butter
4 cups of your favorite dried mix of all-natural oats, dried berries, fruit, grains, and nuts (you can even use all-natural organic granola)
2 pinches sea salt
½–1 cup oat flour (do not use wheat flour)
Your favorite sweet spices such as cinnamon, ginger, nutmeg, cloves, pie spice, mace, etc. (I usually add at least 1 teaspoon or so of these spices combined. Spice as you see fit. You can experiment here.)
2 large eggs (optional)
½ cup brown sugar or cane sugar (optional)
½ cup dried/smoked meat, fresh fruit or berries, seeds, or cinnamon and sugar as topping (optional)

1. Place all ingredients in a bowl and pulverize. A potato masher, meat mallet, or heavy-duty wooden spoon works great. The consistency should mimic Play-Doh with rice. You can always add extra dry ingredients if too thin.
2. Grease 2 round cake pans or prewarmed Dutch ovens.

3. Divide mixture and press into cake pans or Dutch ovens. If desired you may top with seeds or cinnamon and sugar. Be sure to press any toppings into the cake.
4. Bake at medium to medium-low heat for about 30 minutes or until edges of oatcake begin to darken slightly and move away from the sides of the pan. If cooking in a Dutch oven, pull coals away from your main fire, sit Dutch oven on coals, pack coals around the edges, and lay coals on top.
5. Immediately after they are removed from the oven or fire you will need to press the cakes under a heavy weight. You can choose a flat rock or griddle and top with the Dutch ovens. Leave sit away from critters for several hours to overnight.
6. Enjoy! The older the oatcake gets the drier it becomes. However, lard will maintain its moisture longer than most fats. This is helpful in flavoring, consistency, and preservation.

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Hush Puppies

A delicious side when served with fish.

1 cup whole-wheat flour
1 cup cornmeal
1 cup whey, water, or milk
1 teaspoon baking soda
1 teaspoon sea salt (try smoked salt for even better flavor)
Hot oil or lard for frying

1. Mix all ingredients except oil together to the consistency of a thick cake batter.
2. Place lard or oil in cauldron or Dutch oven sitting on hot coals or hanging over the fire with consistent heat.
3. When oil is hot (a small piece of batter dropped into the oil sizzles) drop batter into oil by large spoonfuls.
4. Turn hush puppies several times to brown evenly, about 2–3 minutes each.
5. Remove and enjoy! Try various dips and toppings. I like vinegar on my hush puppies.

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Horseradish Sauce

Be careful in tasting and grating horseradish as it contains caustic oils that can burn the skin and eyes. Sauce is excellent when used to coat meat that you will flash-fry prior to roasting.

2 parts wild horseradish
1 part olive oil
Salt, to taste

Scrape the horseradish root with the back of your knife or grate. Macerate the horseradish greens. Add olive oil. Salt to taste and serve.

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Cured Fish

Any fatty fish such as salmon or trout can be used. I have personally used trout and salmon.

1 fresh-caught trout
1 cup salt
1 cup sugar
1 teaspoon ground white pepper
1 cup fresh dill or fresh mint

1. Clean your fish, leaving skin on.
2. Split fish down the center. Be sure to remove pin bones by running your hand down along the fish against the grain.
3. Mix together dry ingredients (not including the mint or dill). Rub dry ingredients onto flesh of fish. Sandwich dill or mint inside of fish.
4. Tie fish together with skin side out. Wrap in waxed linen, waxed paper, or plastic wrap.
5. Keep cool 3–5 days. Weather permitting, bury the whole operation 12–18" in the earth, or add this to your cooler or refrigerator with a weight on top.
6. After 3–5 days, remove, rinse, slice thin, and serve. For a hint of citrus in the out of doors, add wood sorrel leaves to your fish prior to serving.

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Berry Crisp

You can use any berries you like for this recipe—try a mix of several.

2–3 cups fresh or frozen berries
1 cup rolled or steel-cut oats
½ cup whole-wheat flour
½ cup brown sugar or organic cane sugar
½ cup butter, softened
1 teaspoon ground cinnamon

1. Put berries in the bottom of a well-seasoned Dutch oven. (If berries are very tart, top with a little sugar and cinnamon now.)
2. Mix together oats, flour, sugar, butter, and cinnamon. Top berries with this mixture.
3. Place in coals about 30 minutes or until berries are bubbling. Serve and enjoy!

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Easy Peach Cobbler

This recipe really couldn't be any easier!

1 can peaches (about 16 ounces)
1 package spice cake mix (about 15½ ounces)
½ cup butter, if desired

1. Empty can of peaches into Dutch oven, juice and all. Shake dry cake mix on top of peaches. If desired, place dabs of butter on top of cake mix.
2. Bury the Dutch oven in the coals for approximately 30–40 minutes until peaches are thick and bubbly.

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Easy Chocolate Cherry Lava Cobbler

Nothing goes better with the great outdoors than a little chocolate!

10 ounces Dr. Pepper or Coke
1 package chocolate cake mix (about 15½ ounces)
2 cans cherry pie filling (about 20 ounces each)

1. Preheat seasoned Dutch oven to medium.
2. Take a drink from a 12-ounce can of soda. Add soda to cake mix and mix slightly.
3. Empty pie filling into the bottom of Dutch oven. Spoon batter on top of cherries. Cover with lid.
4. Cover Dutch oven in coals and bake approximately 30–40 minutes or until cake is set.

Tips and Tricks

- Cooking over a campfire or using a camp stove is not as predictable as using a regular stove or oven. Keep an eye on your meal, and don't be afraid to turn food items over frequently to assure even cooking. You may need to rake hotter coals closer to your pot as you cook to ensure thorough cooking.
- You'll enjoy your meals more if you use what's local to make the recipes, especially if you've foraged for or caught it yourself.
- Try some of your favorite recipes over a campfire. Choose recipes that don't have a lot of steps and don't require a lot of bowls, pots, and pans. You'll be cooking like a pro in no time.

- All of the recipes in this book are just meant to get you started. Add your own variations to the meals. If you're not a big sausage fan, use ground beef. If you didn't pack in Old Bay Seasoning, try your favorite blend. Check out the Simple Ingredient Substitutions table in Chapter 5 for more ideas.
- To get a sense of the possibilities, try cooking in a variety of ways—on the coals, in foil, using a Dutch oven, on a stick. You'll see that just about any recipe you can dream up at home can be made in camp.

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Chapter 17

Preparing Unconventional Foods

“He was a bold man who first ate an oyster.”

—Jonathan Swift

If you find yourself in an unexpected situation where your pack is empty and you’re still out in the wilderness, you don’t have to rely only on the nuts and acorns you can glean from your surroundings. You can also forage for unconventional foods—things we don’t normally think of as food.

But even in a non-emergency situation, you may want to learn to love grubs. Why eat bugs if we don’t have to? Probably the number one reason to get used to eating bugs is that they are very healthy to eat. Most bugs, depending on species, are full of protein, fiber, healthy fats, vitamins, and essential minerals. Grasshoppers actually contain more protein pound for pound than ground beef. Grasshoppers also pick up flavor easily during cooking so if you don’t like the flavor of your local species it is easy to change.

Bugs in general are one of the most prolific food sources on earth. This alone makes them worth understanding as a food source and trying something new is always interesting at the least. Dried bugs can easily be ground and mixed to extend existing resources like flour and other grains, and the risk of infectious disease is minimal at best compared to actual meat

from animals. Most of us already consume bugs and their larva or eggs without realizing it in our foods anyway. This is just the next step and it has been a traditional dietary source in many countries since ancient times.

Insects You Can Eat

Remember that most of the things you look for as bait for fishing are actually edible as well in an emergency. While you can eat most insects raw, they usually taste better cooked. Cooking helps kill any bacteria and makes the insects more appealing to eat.

To prepare, remove heads, wings, legs, and antennae to make the insects go down easier (this also helps eliminate potential sources of contamination).

- All worms like night crawlers and red worms are easy protein sources and very rich in proteins at that. To process a worm just start at one end and squeeze all the brown stuff out and you can consume it raw. Or you can soak them for several hours to get the dirt out. You can also use in stews and soups if you desire.
- Grasshoppers should be skewered and cooked well as they can carry tapeworms but are edible just the same. Pull the head off first (the insides should come out, too). Crickets and locusts can also be eaten roasted, fried, or boiled.
- Ants are small and take lots to make a meal but throwing them in a pot and melting some chocolate on them will make them go easier. You can also roast them and season them with salt. Carpenter ants, leaf-cutter ants, and honeypot ants are all fair game.
- Bees and wasps can be roasted and their larvae fried in butter. Remove stingers first.

- If you can find a termite mound run a stick into the mound and wait for it to fill with termites, then consume them raw. It may not be pleasant but it is food. (You can use this same technique to catch ants—find an anthill and run a stick into it.)
- Grubs are also fairly high in protein and can be roasted in hot embers and eaten if needed. When consuming large grubs raw it is a good idea to remove the head with a sharp knife to avoid the mandibles.
- Snails and slugs can carry parasites, so it's best to cook them before eating.
- Scorpions are not bad. Cut the poison sack off the end of the tail connected to the stinger and cook on coals or eat raw if needed.

Insects You Shouldn't Eat

Some insects are poisonous or may be likely to be contaminated in some way. Avoid eating these insects:

- Caterpillars should be left alone as some are poisonous.
- I steer clear of most arachnids (eight-legged critters). This is my own preference, of course, but if I cannot positively identify the source of food I do not eat it, so my recommendation is stay with common insects we all know from childhood. As with caterpillars, some arachnids are poisonous, so be careful if you choose to consume these.
- Centipedes and millipedes are generally off the menu for me as well because of identification concerns—millipedes are poisonous and centipedes aren't, but it can be hard to tell them apart.
- Brightly colored insects (yellow, orange, green) should be avoided as they are generally poisonous. Stick with black and brown.

- Don’t eat insects with strong odors. They may be poisonous or diseased.
- Don’t eat disease-carrying insects such as mosquitoes and ticks.

Tips and Tricks

- Catching insects can be a challenge for people used to shooing them away. One simple method is to dig a hole in the dirt near where you’ve seen insects such as crickets, and place a jar or container inside. In the container, place a piece of leftover food. In a few hours, you should have collected some bugs. Put the lid on the container and you have the makings for lunch.
- Grubs and other bugs like to live on the underside of logs; turn over enough and you’ll have a meal.
- Flying insects are attracted to light. You can catch them with a net.
- You can grind insects into a paste and season it, then eat like a dip.
- If you want to test out bug eating before your next camping trip, you can order mealworms and other insects online or purchase them at a local pet store (live insects are often used to feed reptiles).

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Chapter 18

Foraging

"Let food be thy medicine and medicine be thy food."

—Hippocrates

Trapping game, catching fish, and scrounging for grubs aren't your only options for finding food in the wild. You can also forage for nuts, berries, and other edible plants. Many of these food items also serve a medicinal purpose.

Common Edible Plants

A lot of common plants that grow in many front yards are edible. Clover, dandelion, plantain, burdock, and violets are not uncommon in rural areas, and they are quite tasty. However, gaining an understanding of the multitude of wild edibles takes study and several reference guides at a minimum to make sure what we are consuming is what we think it is. We must be careful as some plants are highly toxic.

Clover (edible)

Plantain (edible)

Violets (edible)

Bushcraft Tip

Fungi is another story all together as many more of them are dangerous than are plant species. I don’t recommend eating mushrooms.

Choosing the Right Plants

A good rule of thumb taught by a popular forager know as Green Deane is to ITEMize plants.

- **I**dentification. Identify them positively with several sources. If you misidentify a plant and eat it, you may get sick.
- **T**ime of year. Are they growing in the proper time of year according to references? If a plant that you think is rhubarb (for example) looks ready to pick in September, you may have the wrong plant; in the Northern Hemisphere, rhubarb is harvested in early spring.
- **E**nvironment. Make sure they are growing in the proper environment. If a plant is supposed to like growing in dry areas and you find it in a wet, boggy spot, you may have the wrong plant.
- **M**ethods. Understand the proper methods of harvest and preparation before consuming. In some cases you can eat the leaves but not the stem, or vice versa. Sometimes the berries are poisonous but the foliage is not, or vice versa. Some plants can be eaten raw but others must be cooked before consuming.

May apples (poisonous)

Purslane (edible)

Spend time with someone else who has this knowledge as you are learning.

Wild Edibles

Here are some common plants that can be valuable resources in the wild:

- **Cattails** are nature's supermarket and pharmacy. The young shoots are edible raw or boiled; you can boil and eat the rootstock tubers as well. The pollen collected from the seed heads can be used as flour, and you can eat the young seed heads like corn on the cob.

Cattails (edible)

- **Field parsnip** was used as a staple food for centuries but is now forgotten by most; the root of this plant is a great starch and can be baked like a potato. Warning: contact dermatitis can occur when handling this plant.
- **Dandelions** are a great green for a salad or can be eaten on the fly; they are full of vitamin A, and the flower tops are edible as well. Dandelion root is a good coffee substitute when dried and ground.

Dandelions (edible)

- Young leaves of the **burdock** plant are especially good for salad greens, and the large taproot is fine starch.

Burdock (edible)

- **Arrowhead** is another water plant with an edible tuber that has high starch content.
- **Bulbs** can be stored in a cool, dry place for a whole season. Some great plants with edible bulbs include wild garlic or onion garlic. Ramps and leeks also contain edible and delicious bulbs.
- **Yellow nut grass** is another edible root plant native around areas of water where cattails and arrowhead are found.

Onion garlic (edible)

Wild onion (edible)

Wild Onion and Wild Garlic Sausage Patties

Use wild onion and wild garlic to spice up your sausage patties.

Finely mince fresh-picked wild onion and wild garlic. Mix into ground sausage and fry as normal in a pan over medium heat.

Herbs to the Rescue

What if you're having a bit of tummy trouble but you don't have any Tums on hand? You know that coriander can help with digestive issues, but you didn't pack any in. What can you do? Sometimes the best herb is the herb you have! You may not always have the specific herb you want in a given situation so sometimes you just have to wing it. That is where understanding a bit more about herbal properties comes in to play.

Be as proactive with herbs as you are with other resources, like fire-building materials. Collect them as you go—especially if you haven't packed in something to care for an issue that may arise.

One thing I tell my students is to learn to positively identify the harmful plants first. There are far fewer of these, and then you know beyond that you are safe to consume or use what you find. What harmful plants you are likely to encounter depends on where you are, but some common ones are jimson weed (thorn apple), oleander, larkspur, and the twigs and foliage of wild cherries. The color insert in this section will help you identify some of these more common toxic plants.

Dogbane (lookalike—avoid)

Queen Anne’s Lace (lookalike—avoid)

Hemlock (lookalike—avoid)

Bushcraft Tip

Charcoal isn't, of course, a plant, but I mention it here as it can be an indispensable resource in case of accidental food or plant poisoning. Ground in water, it will immediately induce vomiting and has absorbent qualities to remove leftover toxins from the stomach.

Plant Properties

Once we have assured ourselves through proper education that a plant is safe to use and consume, we should begin to experiment and learn to not only identify the plant in all seasons but we should experiment with it as a

tea, as a wash, as a poultice, and so on. We can research what the plant is good for. Remember that many plants act differently on different people and getting to know what works well for you is important. To me it is very important to understand certain things about a plant, since that gives me lots of clues as to its uses beyond a food source.

Medicinal Properties of Plants		
Plant	**Use**	**Notes**
Cattail	Tooth and gum care	Cattail has a very good gel that is present at the base of the sheath when the shoots are pulled out. This gel is anesthetic and antiseptic; you can liken it to aloe, as it is great for local pain relief from burns or stings. The young shoots of this plant make great toothbrushes as well.
Mullein	Cold/congestion, female cycle needs	Mullein has been used for centuries as a decongestant and is great for cough and cold remedies; the large, soft leaves of this plant can be used as wound dressings and are absorbent for female needs.
Jewelweed	Contact dermatitis	Jewelweed plant has chemicals within its juices that help alleviate the symptoms of contact dermatitis from poison ivy and other plants. The freshly picked plant can be rubbed on the skin. It is important to use this plant as soon as possible after contact from a problem plant.
Plantain	Bites/stings	Plantain can be used as a poultice by chewing the plant and then placing the macerated leaves on a sting or bite. It helps to draw out foreign objects such as splinters and thorns as well as the poison from a sting.
Mint	Headache	Mint has many excellent properties for general and medical use. Fresh mint leaves rubbed on the temples will help ease minor headaches. A decoction of mint can also be gargled for sore throats.
Mint and dandelion	Upset stomach	Dried mint and dandelion infusions are good for an upset stomach and will help relieve diarrhea.
Mint and yarrow	Cold and flu symptoms	An infusion or tea can be made with mint and yarrow to relieve cold and flu symptoms.
Yarrow	Blood coagulant/cold and flu care/insect repellent	Yarrow has been known throughout history for its abilities to clot blood from deep wounds; it also has anti-inflammatory properties. It will induce sweating when consumed as a tea and helps to break fevers. Recent studies have also shown that it’s a great insect repellent.

Boneset	Deep bruises, breaks, fevers	Boneset as an infusion will help break a fever, while a poultice of the green leaves will help with deep bruises and even bone repair.

Application of Medicinal Plants

Medicinal plants are mostly used in four ways:

1. **Poultice:** By gathering the plant leaves and flowers raw and macerating (crushing) them, you can form a poultice. This can then be steeped in boiled water or even chewed in the mouth (spit poultice) if it's an emergency, then placed directly on the affected area and wrapped with a bandanna or bandaging.
2. **Infusion tea:** To make a tea or an infusion, steep as you would a poultice for approximately 10–15 minutes, and then consume the liquid after straining.
3. **Decoction:** A decoction is much like an infusion but requires the material to be boiled, not steeped. This method is used for any bark material or roots. The liquid is then strained and consumed after boiling away half the liquid.
4. **Wash:** A wash is an infusion used to clean the affected area. In this case, the plant is not eaten at all.

Poke weed (poisonous)

Using Your Senses

Tasting and feeling plants can give us lots of clues about their uses (once we are sure they are safe to eat). The sensations plants give us on the palate are very indicative of what they will do within our body as well. Generally to aid in an issue we look for plants that produce the opposite of existing conditions. So, for example, a hot or pungent herb will warm up the chills. A citrusy plant will cool down a warm body.

Put it in your mouth, chew it up, roll it around; feel what it is doing on the palate and how it tastes. Based on taste, you'll be able to divide it into one of four categories:

1. **Biters:** Plants that have a bitter or acrid taste are generally good medicine for colds and flu. They will generally be both antiseptic and antiviral in nature.
2. **Mucilaginous:** Plants that make the mouth water or are slimy will be good for constipation, as they will "grease the pipes," so to speak. They will be good for dry irritated sinuses, as well as burns.
3. **Astringents:** Plants that are astringent will pucker your mouth or dry out your palate and will do the same thing in the body or on the skin. They will dry poison ivy, help dry up diarrhea,

   and cure a runny nose.

1. **Carminatives:** These plants will feel warming or spicy, and will be great for stomach upset and general relief of gas and discomfort in the digestive tract.

Bushcraft Tip

Most wild herbs can be air-dried for later use. You can grind these dried herbs into flavorings for food and teas. A few of my favorites are mustard seed, garlic mustard, mint, shepherd's purse, and dock seeds.

Nuts

Rich in protein, nuts are some of the easiest plant-based food resources to harvest.

Pine Nuts

All pine nut seeds are edible so you do not need to worry about identifying different species. Some do, however, have larger seeds than others and, even though you can eat them green, the older ones taste better. The trick is to catch them just at the right time before they drop from the pinecones. Look for cones that are turning brown but have not yet opened. Arrange them around a fire and the warmth will force the cones open so that you can collect the seeds.

Hickory Nuts

Hickory nuts are delicious and especially valuable because their shells efficiently lock out moisture and insects so they keep for a very long time. Most folks do not care to fool with hickory nuts because they can be so difficult to open. And after all that work, oftentimes you will end up with small pieces of shell everywhere and only a tiny bit of meat.

Let me share a secret with you. You have to take advantage of the internal structure of the hull itself to break it cleanly. I prefer to use an axe, but any hammering device—even just a stone—will work. Turn the nut so that it is lying sideways and the sharp, raised edge is on top. Basically, turn it to the spot where it wobbles and will not stand on its own. Then strike the seam in a spot about one-third of the way from the base of the stem. If you follow these steps, you should easily pop the nut into three pieces every time with plenty of exposed meat for the picking.

Hickory nuts (edible)

Walnuts

Walnuts, specifically black walnuts, are a totally different animal from hickory nuts and must be treated differently. If possible, collect them before they fall from the tree and then store them until they turn black. If you do collect any from the ground, inspect them very closely for worm holes.

Black walnuts (edible)

Remove the outer skins from the shells when they turn black and use the skins for dyes and medicines. Once you have revealed the nut shells themselves you can then break them open and eat the meat inside. Walnuts do not store in the shell as well as hickory nuts. If you decide to save them for future use, dry them before storing. Leave them in the shell and crack open just before eating.

Fruit, Vegetables, and Herbs

Fruit like raspberries, blackberries, and blueberries can be found in many parts of the country. Berries are energizing to eat and add vitamins and fiber to your diet.

Foraging for Berries

Take extra care to make certain you can positively identify any berries before eating them. When in doubt, do not eat!

When looking for berries, scan the area from ground level to eye level. Look for low fruit trees and bushes. A lot of species are creepers so scan the ground very well. Remember that berry plants are biologically constructed to protect themselves from birds, so they are often hiding under greenery or surrounded with thorns. Keep a close eye out for poison ivy too.

Fruit Foraging		
Fruit	**Where to Look**	**Season**
Blueberries	Blueberries grow in bush form. They flourish in acidic soil so you can sometimes find them in dried-up beaver ponds or near oak trees. They grow particularly well in sunny meadows.	Flowers in spring, berries in summer.
Elderberries	Moist forest soil along trails and around open fields.	Bloom June to July; fruits appear in late summer into fall.
Raspberries	Grow in bushes, usually found in areas that receive full sun.	Blossom in spring, fruit in summer.
Blackberries	Grow in small patches of brambly-looking vines. Look in areas near drainage ditches or trails.	Bloom in midsummer, eat in late summer.
Wild cherries	Grow rapidly from seeds dropped by birds so they are usually found as colonies of trees in clearings.	Blossoms in spring, fruits in summer; often hold until fall.
Cranberries	Grow best in acidic soil and bogs.	Ripen in the fall and usually stay a plant through the winter.
Strawberries	Grow close to the ground anywhere.	Blossom in spring; fruit in early summer.
Mulberries	Can be white, red, or black.	Very hardy, can survive in extremely cold temperatures.
Wild grapes	Occur throughout the eastern woodlands in several species.	Very hardy and cold-weather resistant.
Autumn olive	This species is invasive and grows in mostly field edges.	Blooms in early fall and becomes better after the first frost so it is a cold-weather plant.

Bushcraft Tip

Many fruits and plants also produce natural dyes. Raspberry will make red, goldenrod is deep brown, pokeberries make a purple dye, bloodroot is orange to reddish. Dyes made from berries can be soaked in a hot fixative of salt water, while most plants will require a vinegar for fixing.

Raspberries (edible)

Other Edible Plants

Many plants provide storable food resources such as seeds, seasonings, or bulbs. These food items can be processed and dried for later use.

Bulbs

Bulbs can be stored in a cool, dry place for a whole season. There are some great plants with edible bulbs to be found in the woodlands, including wild garlic or onion garlic. This last is one of my favorites for sure. Ramps and leeks also contain edible and delicious bulbs.

Ramps (edible)

Roots and Tubers

Cattail contains an edible starchy tuber that can be eaten as well as stored dry. Arrowhead is another water plant with an edible tuber that has high starch content. Burdock contains a large taproot similar to the potato and can be easily stored for later use if kept dry. Dandelion root makes a good drink or coffee substitute. You can even dry it and grind it down for later use in a hot drink. Yellow nut grass is another edible root plant native around areas of water where cattails and arrowhead are found.

Tips and Tricks

- I discourage you from eating wild mushrooms at all since many are highly toxic.
- You don’t have to learn about every wild plant in order to forage. Learn about the edibles in your area or where you like to camp. Local knowledge is what matters.
- You can find local experts at plant societies or through the extension service.
- Try a taste before you eat in bulk. Everyone is different. Plants that one person can eat and enjoy will make another sick.
- Regarding nuts, be careful of mildew, which is the real enemy of any seed. Keeping them dry is the key.
- Knowing some basic plant lore can keep you from wasting time. Nearly 100 percent of all white berries are toxic, for example; you don’t need to bother finding out if the white-berried plant that grows in your local woods is edible. It probably isn’t.

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Chapter 19

Preserving Caught and Foraged Foods

"Good food is very often, even most often, simple food."
—Anthony Bourdain, *Kitchen Confidential*

As you consider harvesting the resources from the world around you, you should consider what can be preserved. Letting food spoil or otherwise go unused isn't just wasteful, it creates more work for you.

Humans have been preserving food since the beginning of time, from cooking a large quantity of meat in order to make it last for a few days longer to burying it in snow to keep it fresh. There are a variety of ways to preserve meat and process plant food sources to extend their use.

Flours and Meals

Plant-based flours and meals can be used in many recipes and are a good way to preserve some plants.

Acorn Flour

Acorn flour was a staple food item for many Native peoples throughout history and remains a major source of food for forest animals today. I tend to seek out white oak acorns because they have fewer tannins and taste less bitter. Tannins within the acorn can give it a very astringent

taste. It is important that acorns are processed correctly so they have a gentler flavor.

To process, you must first remove the shells. A rock or an axe can do this job efficiently. Then place the crushed acorns in a bowl of water where the shells will float and the meat will sink. Toss the shells. You want to process the meat down to the smallest size granules possible so you will want to leach the meat and remove the tannins.

To do this, drop the meat of the acorns in a clean batch of boiling water and let them cook until the water becomes brown. This discoloration is from the tannins. Place the acorn meat in another pot of boiling water and repeat the process. Make sure the water in the second pot is already boiling because if the acorns come in contact with cold water the process will undo itself. You will likely need to move the acorn meat to a new pot of boiling water 3–4 times before the staining stops. When the majority of the tannins have been removed, the water will start to run clean.

In an emergency, the acorns can be leached in running creek water by placing them in a cloth sack and leaving them in the creek for a week or so. Just know that the resulting flavor is not as reliable as what you get with the boiling method.

Once the meat is well soaked and clean you can grind it into a meal for hot cereal, use it as a bread ingredient, or dry it out and store it for later use. If you decide to save the acorn flour for later, plan to soak it in water before you use it to rehydrate it to its mushy status.

Acorns (edible)

Bushcraft Tip

The tannins that give acorns their astringent taste can be a great resource for other things such as medicines and tanning. Save the liquid from the first boiling pot of water you used to leech the acorn meat and reserve it for later use. Astringents work best for external use in a wash or poultice, but the solution will be antiparasitic as well.

Cattail Flour

Cattail makes the best form of starchy flour that nature has to offer, and the process of extracting it is not overly complicated. First you will

need to collect a good bucketful of cattail roots. Loosen the soil around the cattail and its root area. Then put your hand at the base of the stalk and pull to release the entire plant with the root. At this point you can ditch the stalks and just hang on to the roots. Once you have washed them thoroughly and peeled them, place them in a bucket of clean water. Now begin to break up the roots, which causes the flour to separate from the fibers. Continue until you have separated all the fibers in the roots. As you work, the flour will settle at the bottom of the bucket. Pour out the excess water and dump the remaining mush on a flat surface where it can dry in the sun. Once the flour is completely dry, store it in a cool, dry place away from insects.

Bushcraft Tip

The center of the cattail shoot is a nutrient-dense edible resource that makes an excellent vegetable you can simmer in soups or sauté as a side dish. Harvest the cattail shoots in dry weather so that the ground is not too muddy. Select large stalks that have not begun to flower, and separate the outer leaves from the core of the stalk. Discard these tough outer layers until you get down to the soft center. This process requires a lot of peeling, and your hands might get pretty sticky, but the product is delicious and rich in vitamins including vitamin C, beta-carotene, and potassium.

Cattail Acorn Bread

2 cups acorn flour
2 cups cattail flour
2¼ teaspoons active dry yeast
1½ teaspoons salt
⅓ cup maple syrup
½ cup water
1 cup milk
2 tablespoons vegetable oil

You can mix these ingredients into a dough and throw it on some hot coals to make ash cakes.

Ash Cakes

Ash cakes are one of the easiest things to make in camp, and self-rising JAW mix works great for this. In the old farm days these were cooked on a farm hoe and called hoe cakes.

What I like to do is just mix in the bag, so I open it, pour in a few tablespoons of water, and stir to create a ball on the top of the other dry powder that did not absorb water. The ball should have the consistency of cookie dough. Take the ball out of the bag and sprinkle with some dry mix after flattening. Then place on hot coals, turning once during the cooking. It takes about 5–7 minutes to cook. Wipe off the ash after cooking. You can use this same formula for cooking on a shovel over coals.

Saps

In the early winter months, many trees can be tapped for their sap but maples and birches are the best sources. This liquid makes a delicious drink straight from the tree on a cold morning or it can be further rendered into syrup by boiling it down to evaporate the water content.

Maple Syrup

Maple syrup is made by further rendering the sap so that it becomes a sweet sticky liquid. Maple syrup can be used to sweeten any food or drink and keeps very well if stored properly. Once the sap is collected, pour it into a cooking pot until the pot is about ¾ full. Next boil the sap to evaporate all the water content. This will take several hours of constant boiling. The most

difficult thing about making maple syrup is knowing exactly when the water has completely evaporated and the syrup itself has started to boil.

When this happens, the liquid will actually burn, something you want to avoid. Keep an eye on the color. The syrup should gradually turn gold and then darken until it becomes the mahogany shade of maple syrup. Once the syrup is complete you can strain the liquid to get rid of any particles that might have fallen into the concoction during the long boiling process. Pour into glass jars or plastic containers and store in a cool place. It should last in the refrigerator for about 6 months.

Maple Sugar

Maple syrup can be even further processed into a delicious sweetener called maple sugar. Bring maple syrup to a boil and skim off the air bubbles as they rise. Reduce the heat a little if it starts to boil over the sides of the pot. When the air bubbles stop appearing, remove the liquid from the heat and transfer it to a wooden bowl. Stir for at least 5 minutes to remove any remaining moisture and then let it stand until it turns hard. This hard material can be ground into sugar and stored in a cool place.

Meat

Preserving meat, no matter which method you choose, is a critical process because meat spoils very quickly, especially if you do not have access to refrigeration. Here are a few ways of preserving meat from your hunting or trapping campaign so that it can be safely consumed later.

Salt Drying

Moisture is the enemy in meat preservation because it allows bacteria to grow. The process of drying meat involves pulling moisture from the

meat at a slow rate so that the outside of the meat does not dry first. If the outside of the meat dries too quickly, moisture might get trapped inside, which will cause the meat to go rancid. With this understanding, two environmental conditions are necessary for properly drying meat:

1. A humidity level of about 30 percent or less
2. A few straight days with an even temperature where there is little fluctuation from day to night

For this reason, winter is generally not a good time to air-dry meat. Be careful in the spring that the weather is not too humid. Consider also the meat that will be used. Meats containing high concentrations of fat hold moisture, which makes the fat go rancid quickly.

If you do not have the means to cool the meat in a refrigerator, then you will need to salt it immediately after gutting the animal. All of the fatty tissue must be removed from the muscle meat before getting started. Then slice each piece of meat into long thin strips that are similar in size so that you can achieve even drying. Prepare a heavy salt solution into which each strip will be dipped before hanging.

Salt-Dried Meat and Fish

This solution will add flavor to the meat, speed up the drying, and keep insects away.

20 ounces salt
1 gallon water
Meat strips

1. To make a salt solution for drying meat and fish, stir salt into water until the salt is dissolved.
2. Dip the strips into the salt solution right before hanging. Suspend the meat strips vertically by the thickest end. Attach them to a line with loops of cordage of a small diameter if possible. Dried meat can then be stored in a breathable bag. You can eat it just as it is or rehydrate right before use.

Sun Drying

Sun drying works best with fish, but the main concepts are the same regardless of the game you're sun drying. Again, evaporating the moisture from the inside layers to the outside is absolutely critical. Remove the heads and guts and then split the fish right at the spine. Now you should have two pieces, side by side with the skin on top of each. From here, cut the fish into several equal chucks. Fish will generally dry more quickly than red meat. Dip the strips into the salt solution. Dry the fish strips on racks, which you can easily fashion with two tripods and a cross-stick.

Jerky

You can make jerky by adding a good salt solution and some spice to the meat, which is then dried over a low-heat fire about 120ºF. Cut the meat into lean, thin strips before drying.

Making jerky is different from salt drying because when making jerky, direct heat (not just the sun) is used to hasten the process. Hunters used this process long ago because it does not necessarily require salt or rubs (although those extras can give it a sensational taste) and it makes storage and transport easy. They would eat all they could at the kill site and then dry the rest, which substantially reduces the weight of the meat. If done properly, 1 pound of meat will reduce to about 4 ounces. When finished, the meat should crack when bent but not snap in half. It should be dry and not moist or greasy.

Cold Smoking

The cold-smoking process is similar to making jerky in that you cut meat into thin strips, then salt and dry it with heat. Here, meat is dried at a temperature that is lower than what you use for jerky, about 85°F. You want a fire with lots of smoke to add flavor (and deter bugs). This method takes 12–24 hours in most cases.

Cold Hanging

In the winter, if the temperatures linger around freezing for a few days, meat can safely hang to dry. The cold temperatures ensure that bacteria do not develop. In this process, the meat does not need to be deboned and cut into strips but the animal must be completely gutted and opened with a cross-stick in the breast so that the carcass stays open while it dries.

Tips and Tricks

- Meal planning can help cut down on the need to preserve foods you've gathered or trapped. But be flexible; it's easier to carry out the JAW packets that you packed in because you thought you might need them than it is to preserve all the trout you caught; eat the trout and save the JAW packets for next time.
- Remember to store all food in bear-safe containers.
- Except for when you're drying foods, keep them out of direct sunlight as this tends to speed the spoiling process.
- Whether you're at home or in the bush, the principles of food safety are always the same. Cold foods need to stay cold; hot foods need to stay hot. The range between 40ºF and 140ºF is known as the "danger zone" because this is where most food spoilage occurs (bacteria grows rapidly in this temperature range).
- Don't leave food out when you leave the campsite. It doesn't take long for squirrels, raccoons, and other animals to come investigate—and leave a mess.

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Part 4

Emergency Cooking

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Chapter 20

Cooking with Your Engine

“To succeed, planning alone is insufficient. One must improvise as well.”

—Isaac Asimov

If you’re caught in an emergency situation where your typical methods of cooking food aren’t available, you can use one of several different unconventional methods of cooking. The first is to use your car.

The engine compartment of a running vehicle traps a ton of heat, and depending on what and how you are cooking there are a good range of temperatures that can be manipulated by raising and lowering the hood.

Remember that there are all sorts of fumes and possible contaminants under the hood, so anything cooked should be covered with a lid or wrapped in foil if possible. Shallow and wide pots and pans will heat faster than tall and narrow ones for any heat source but for this it will help even more.

The radiator is about 180–190ºF while the car is running as long as the fan is working. The areas closer to the engine block such as the exhaust manifold will be hotter than this, so you have a range of heat levels. The best cooking like this is done either in the can with canned foods or in aluminum foil or foil tins. These are the safest methods and will not ruin a good container or contaminate the food. A small log or rock used as a wedge will let you rest the hood almost closed to keep the heat trapped but will also allow you to observe the goodness as your meal cooks.

You can even place foil-wrapped meals in wire mesh and tie them down so they can be cooked while driving down the trail for a hot lunch at midday. Of course there is no exact science to cooking in an engine and there are many variables, but using precooked foods or heat-and-eat meals will work fairly well in most conditions.

Bushcraft Tip

Anything you have left from the last meal can be wrapped into an aluminum-foil envelope and reheated near the manifold.

Engine-Cooked Recipes

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Canned Surprise

Wanna have some fun camping?

Remove the labels from 5–6 cans of random food from ravioli to beans-and-weenies, then make the kids pick a random can

Place the unidentified can near the manifold to cook about 20 minutes, then serve.

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Buick Burritos

Leftover cooked meat (a few ounces per tortilla)
Beans, cheese, salsa, hot sauce (as desired)
Corn tortillas

Wrap cooked meat and fixings into a corn tortilla. Wrap in foil and lay across the radiator lengthwise about 10–15 minutes. Serve.

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Baked Stuffed Potatoes

1 medium potato (russet works well for this)
Butter, bacon bits, chopped onion

Cut open the potato lengthwise. Add butter, bacon bits, and chopped onion. Wrap well in foil and place on manifold about 30–40 minutes until a fork will pass in and out easily.

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Cherokee Cheese Bread

I use my Jeep for this now and again, hence the name.

Ready-mix garlic cheese biscuit mix
Water (as indicated on the package directions)

Stir water into biscuit mix and pour into a small loaf pan. Cover with heavy foil and bake near the manifold 12–15 minutes or until a fork comes out dry.

Tips and Tricks

- As with anything, trying it at home before you have to resort to it in an emergency can help you be prepared for whatever happens.
- Almost any recipe that requires just oven cooking can be cooked on your engine. You will have to adjust cooking times.
- Always turn off the engine before putting food on the engine or taking it off.
- Only the metal parts of the engine will get hot enough to cook. You can gauge the relative heat of various parts of your engine by running the motor for a minute, then shutting it off, then quickly touching the various parts.
- Be sure any food you're cooking isn't blocking air flow, a moving part, or otherwise interferes with the proper working of the engine.

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Chapter 21

Unconventional Fuels and Fuel Tabs

“No one is born a great cook. One learns by doing.”

—Julia Child

We are used to using a few common cooking fuels when camping. Wood and campfires are the simplest and most romantic. Propane and multi-fuel camp stoves like those made by Coleman are also common. In these days of ultra-light backpacking and hiking, alcohol-type stoves have also become quite popular, as well as smaller single-burner multi-fuel canister stoves.

When we look at unconventional fuels we are looking to what we can use if we are without all these items and cannot for some reason burn wood logs. Obviously anything flammable from gasoline to rubber will burn, but from a health and safety standpoint these are dangerous fuels for cooking. However, all common cooking oils will also burn and can be contained and used with a wick or multiple wicks to create a makeshift cooking surface.

Bushcraft Tip

Candles will heat food well enough in an emergency. The more candles you use, the more candle power you have. Four of the 12-hour beeswax candles work pretty well.

Wood Chip Bricks

Another easy thing you can do in camp is to mix wood shavings and beeswax for emergency cook fuels. To do this, pack any wood shaving (such as from a chainsaw or wood shop) into a small tin like a cat food can. Pour melted beeswax over the top and let dry. You now have a block of fuel that, if left in the can, will burn for a few hours if needed and get food plenty hot as well.

Animal Fat

Animal fats will burn similarly to lard (which is actually a domestic animal fat rendered for cooking). To render tallow or deer fat, place the scraped fat from the animal in a pan on low heat until liquid forms. Use this as a fuel immediately or after cooling (when it has hardened and is set). It can also be used to replace cooking oil to grease a pan.

Pine Sap

Pine sap is a natural fuel that appears on pines anywhere they are injured. This sap can be collected and will burn very hot for a good long time depending on the amount you have collected. You can burn it in a metal container to contain the fuel source or place it directly on the ground and

light it. This resin will leave a sticky residue on any container placed above it for cooking, and you should never cook food without a container over this fuel as it will impart a bad taste on the food.

Fuel Tabs and Solid Fuels

Solid fuels can be easier to transport than liquid fuels. Fuel tabs are solid fuels sold in tab form. They have several advantages over liquid fuels; they burn smokelessly, they don’t leave ashes behind, and they can burn hotter. There are many sources for solid fuel tabs. Nowadays we can (and should) avoid the older-style surplus tabs, many of which were toxic in some form or another. Now we can get tabs that are much safer and do a pretty good job of cooking food in an emergency.

There are many brands available, and most use the same technology, but you can also save a bit of money and use the Weber charcoal grill starter blocks found in most lumberyards and home-and-garden stores during the grilling season.

The main thing to remember with artificial heat sources and solid fuels is food containment is important to taste as well as, sometimes, your health. Therefore, always cook in a pot (or with the food wrapped in foil) over these fuel sources instead of placing the food directly on the flames.

Foods that can cook at lower temperatures for shorter times are good choices for these types of alternative fuels. For example, just-add-hot-water meals will work better than stews, which require hours of cooking. Warming precooked meals will be easier and faster than cooking from raw.

Tips and Tricks

- The Esbit tabs are about my favorite of the solid fuel tabs. They come individually packaged, are waterproof, and will boil 8 ounces of water in about 4 minutes.
- Tightly rolled newsprint saturated with melted wax is also an excellent fuel source that can be used for cooking when needed if made ahead of time.
- Do not cook open foods like meat on any artificial logs such as Duraflames, as these will taint the food. It is okay, however, to cook in pots, using the logs as a heat source.
- One good use of unconventional fuels is to use them to start a conventional fire. If you don’t have any char to start a fire but you do have a fuel tab, you’ll be eating dinner in no time.
- You can forego the need for an outside fuel source entirely and just pack in self-heating food! Each meal contains its own heating unit and is ready to eat in about 20 minutes.

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Chapter 22

Making a Stove

"To me, unconventional thinking is approaching a problem and asking, 'Why not? Why can't something be done?' If someone can't give me a good reason why you can't do something, I find a way to do it."

—Eli Broad

Some of the best emergency stoves are made with natural materials that you may find around you. For example, a rocket stove can be made with a single log.

Making a Rocket Stove

A rocket stove is basically a portable stove you can build that will burn small-diameter wood and create a nice hot fire (hotter than a typical campfire). Fuel is burned in a chimney that directs the flames to the cooking surface.

The secret to the rocket stove is to create draw when air is lifted from below the fire up through the food on the cooking surface. A rocket stove can be built below ground, above ground, or made portable.

All rocket stoves require three components:

- Draft vent
- Feed tray
- Chimney

You can create the stove with pipe, cans, rocks, cinderblocks, bricks, or any other material that can be stacked. It can also be created from a single log with 2 holes bored into L fashion. See Figure 22.1.

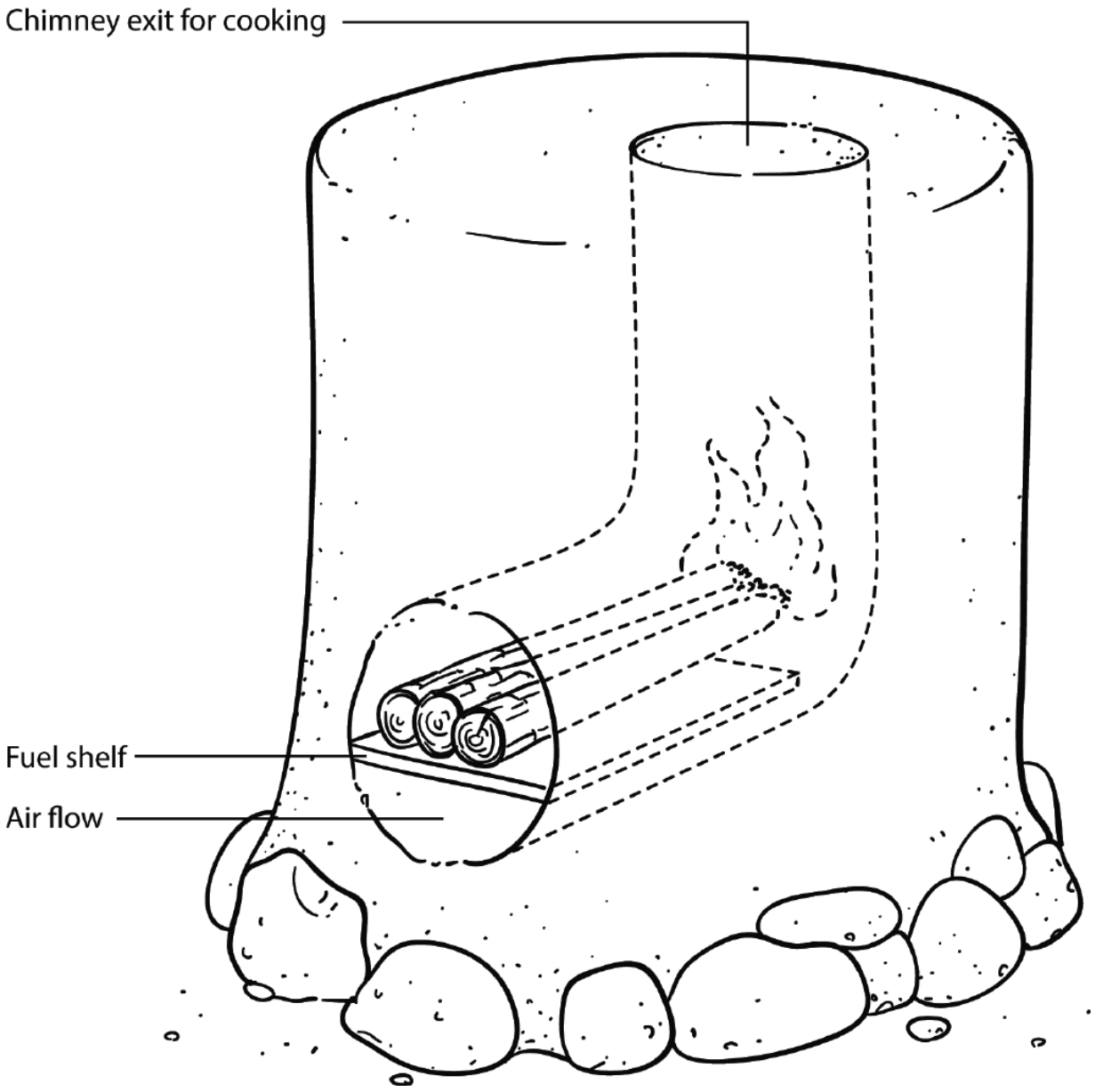

Figure 22.1 Rocket stove

Swedish Fire Torch

The Swedish fire torch is quick to make for a single use and very effective. Start with a bucked hardwood log that is fairly dry, about 10–12" diameter. Using an axe and mallet or a wedge, split the log into quarters. Place the quarters standing in a ring. Build a small fire in the center. This will work in a similar manner to the rocket stove, but the inner dry log will burn and you can place pots or pans on top for cooking. See Figure 22.2.

Figure 22.2 Swedish fire torch

Can Lamp Stove

To make a can lamp stove using a #10 can (this is a large can that can hold about a gallon), cut the can down till it’s about 4" in height. Fill it with cooking oil or lard to about 3". Take some wire and create stands for multiple wicks of natural material. (Inner bark cordage will work in an emergency.) Four wicks should be enough. Place them in the bottom of the can. Let them absorb oil and then light them. Add a couple small ½"-diameter sticks on the outer edge to create air space and place the cook pot on the top. This method will not be as fast as many fuels but will work in an emergency. See Figure 22.3.

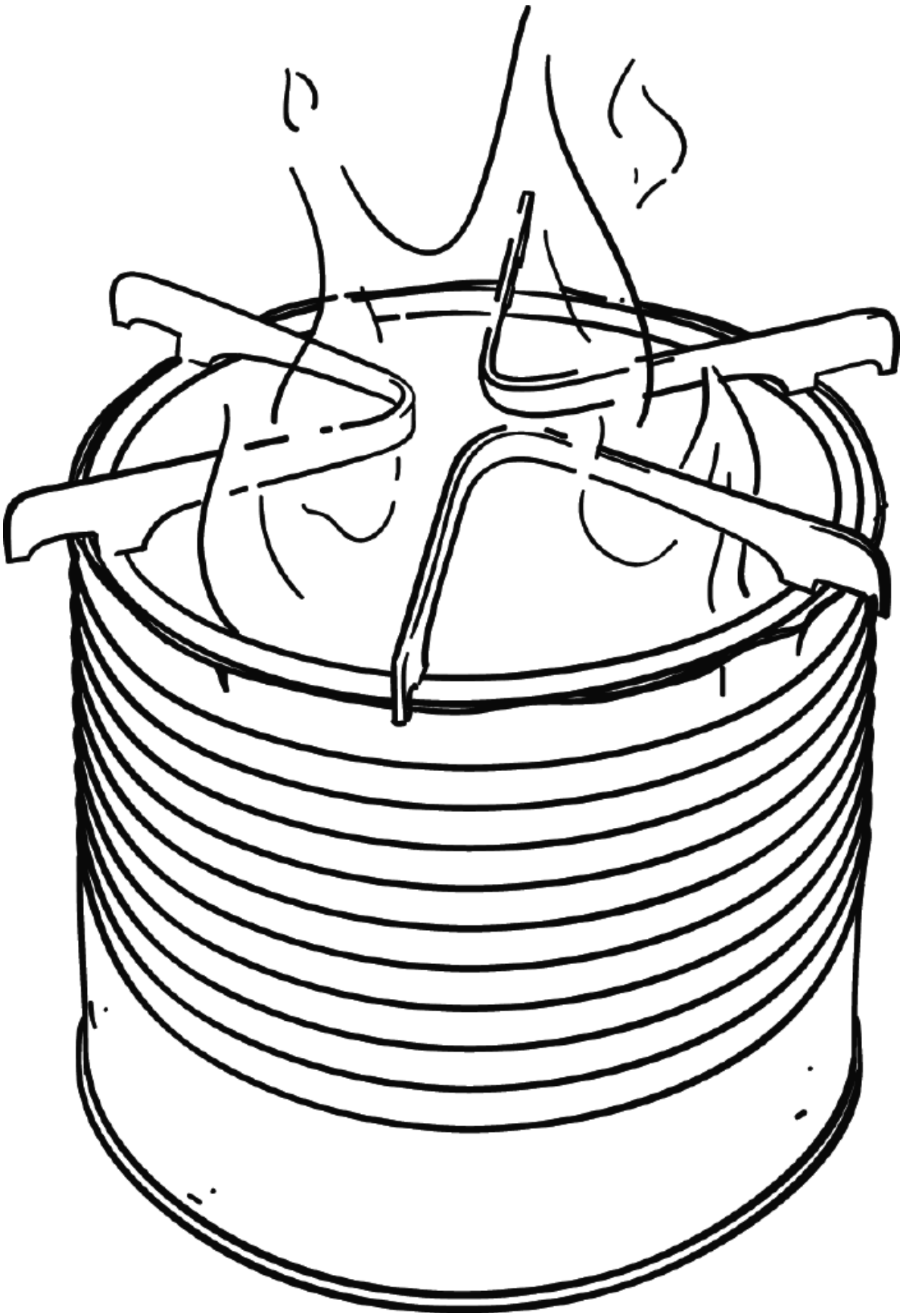

Figure 22.3 Can lamp stove

Double Can Stoves

These stoves can be made from 2 cans with few supplies. Not all aluminum cans are created equal. The cans should be free of dents or dings when you start; the heavier the material the better. The advantage to a stove like this is the flame can be controlled if you have made a simmer ring (heat diffuser). The fuel it will burn comes in many forms, even grain alcohols, and it is very lightweight to carry.

1. Poke holes along the bottom edge of one opened can. About 12–16 holes will do the trick.
2. Cut out the bottom of this can. (At this point, the top and bottom of the can should have been removed.)
3. Cut the can down to about ¾" in height. This is the stove top.
4. Snip the edges of the stove top to form several tabs.
5. Cut the second can down to about 1" in height. This is the stove bottom.
6. Cut an inner wall from the leftover can material. Do this by cutting a strip about 1⅓" wide.
7. Notch the ends of the inner wall, cutting halfway through the strip from the top on one side and halfway through the strip from the bottom on the other. Then the ends will hook together and fit inside the stove bottom.
8. Cut 3 notches, evenly spaced, around one edge of the inner wall strip. Place the inner wall, notches down, inside the stove bottom. Place the stove top on, bending the tabs slightly so they fit inside the stove bottom.

9. For a permanent bond, use a high-temperature tape to keep the top and the bottom securely connected.
10. Create a pot stand to hold the cook pot over the flames. A piece of wire mesh placed over a ring of metal will serve.

To use the stove, pour denatured alcohol into the stove. Filling it about halfway will give you a burning time of about 10 minutes. Then light the fuel. The flame will be difficult to see, so listen carefully to hear it ignite. If the tape catches fire, don’t worry. Just let the fuel burn off. See Figure 22.4.

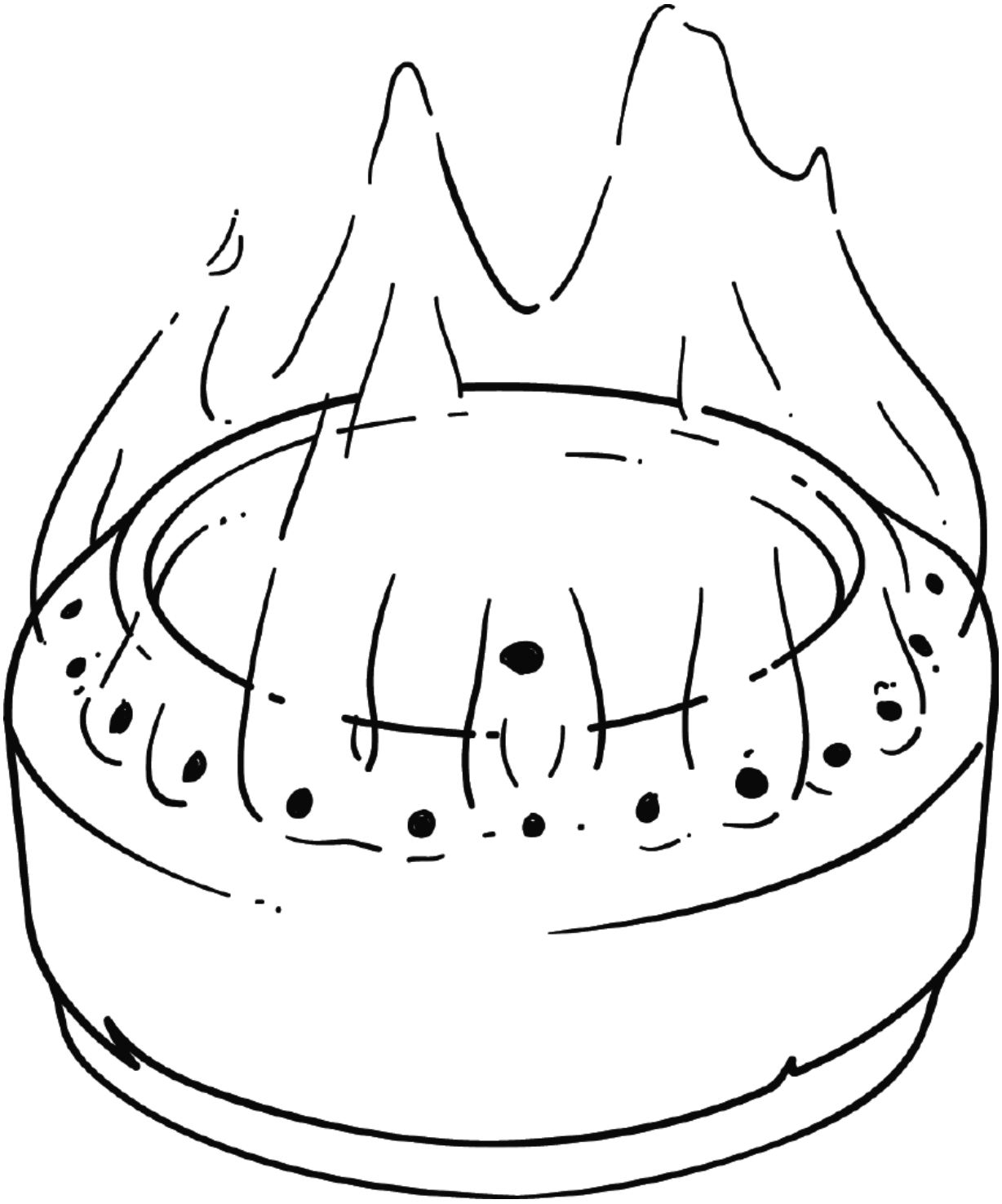

Figure 22.4 Double can stove

Tips and Tricks

- In an emergency, you can make a stove out of just about anything! The key is to understand what a fire needs (heat, oxygen, and fuel) and to identify items in the environment that can serve these purposes.
- Stoves can sometimes be used where campfires are prohibited, so they make a handy alternative.
- Remember, never cook on a camp stove indoors (inside a cabin, inside a tent). Always go outside to cook.
- On windy days, building a shield with aluminum foil can help keep your flame from flickering out.
- Never leave a camp stove unattended.

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Chapter 23

Solar Cooking

“People who love to eat are always the best people.”

—Julia Child

Solar cooking takes advantage of the sun’s rays, a renewable resource, to cook, heat, or pasteurize food and drinks. The technique of this cooking is to concentrate heat by reflecting the radiant heat to a central location. It is different from drying, as cooking needs concentrated heat.

Solar cooking is a great way to cook food without leaving any environmental impact or when fire restrictions are in place.

There are many solar cookers on the market. Some are very expensive, some are less so, but you can improvise them in many ways. One of the easiest ways is to use a simple windshield reflector (the kind for your car, sold commonly in stores for about $5–$10). It also helps if the cooking container you are using is black for maximum absorption of heat. You can accomplish this with high-temperature black grill paint if needed.

Windshield Reflector Cooker

Materials needed:

- A windshield reflector (one that folds like an accordion)
- 3 strips of hook-and-loop fastener (Velcro), about 1½" long each
- 5-gallon plastic bucket

- Black cook pot
- Cake rack (or wire frame or grill)
- Plastic baking bag

1. Separate the Velcro strips into the hook sides and the loop sides.
2. Spread the reflector out. One long end should have a section cut out for the rearview mirror.
3. Along the left side of that cutout, evenly place the hook sides of all 3 hook-and-loop strips and sew them down.
4. Do the same on the underside of the right side of the cutout, using the loop sides of the hook-and-loop strips.
5. When you're done, you should be able to bring the reflector sides together in the shape of a funnel, using the hook-and-loop fasteners to secure the reflector into this position.
6. Set the reflector in the plastic bucket.
7. Place the cook pot (with food to be cooked) on the cake rack, then place both inside the plastic baking bag. Set the rack and pot into the funnel so the rack rests on top of the bucket.
8. Tilt the reflector in the direction of the sun. After cooking, the oven can easily be disassembled and stored.

Timing and Solar Cooking

Everything takes longer to cook using a solar stove, but most things just get more tender the longer they cook, so times are flexible. For example, cut-up pieces of chicken take about 2 hours to cook but can be cooked for 4 hours without harming the taste. This means you can start a meal before leaving camp, then return hours later without worrying about your meal burning or overcooking.

Bushcraft Tip

Make a baked potato just by adding clean potatoes to a dark, covered pot (no water needed). Don’t add water to vegetables when using a solar cooker. Most vegetables (such as asparagus, cabbage, corn on the cob) will take 1½–2 hours to cook. Root vegetables like potatoes and carrots will take about 3 hours.

Most food takes about 3 times longer to cook in a solar oven than in a conventional oven. With experimentation, you’ll be able to find the best times for your food. Remember that the brightness of the day will make a difference in how long it takes to cook a meal.

Tips and Tricks

- Usually you will achieve best results if you cook foods in containers that are black.
- Using a glass lid on a pot can help concentrate the sun’s power—but while durable, glass lids can break under tough camping conditions, so consider the pros and cons.
- You can even make bread, cakes, and cookies in a solar cooker. Give it a try.
- You may have to refocus the cooker on overcast days or when you’re cooking a lot of food at once. Large quantities of food will cook more evenly if divided between several pots.
- Roasts, stews, and casseroles are great choices for solar cookery. Most recipes need less water when cooked in a solar cooker.

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Appendix A: Nutritional Values of Game Animals and Nuts

The following tables give nutritional information for various game animals and nuts you may forage. Nutrition information assumes game animals have been roasted or stewed without added ingredients and that nuts are eaten raw.

Game Animals

Freshwater Bass, 3 ounces

Calories: 124 calories
Fat: 4 grams
Protein: 20.5 grams
Sodium: 76.5 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Beaver, 3 ounces

Calories: 180 calories
Fat: 6 grams
Protein: 30 grams
Sodium: 50 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Wild Boar, 3 ounces

Calories: 136 calories
Fat: 4 grams
Protein: 24 grams
Sodium: 51 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Carp, 3 ounces
Calories: 138 calories
Fat: 6 grams
Protein: 19 grams
Sodium: 53.5 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Channel Catfish, 3 ounces
Calories: 89 calories
Fat: 2 grams
Protein: 16 grams
Sodium: 42 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Clams, 1 cup with liquid
Calories: 168 calories
Fat: 2 grams
Protein: 29 grams

Sodium: 127 mg
Carbohydrates: 6 grams
Sugars: 0 grams
Fiber: 0 grams

Crayfish, 3 ounces
Calories: 70 calories
Fat: 1 gram
Protein: 14 grams
Sodium: 80 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Deer, 3 ounces
Calories: 159 calories
Fat: 7 grams
Protein: 22 grams
Sodium: 66 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Frog Legs, 1 ounce
Calories: 21 calories
Fat: 0 grams
Protein: 5 grams
Sodium: 16 mg
Carbohydrates: 0 grams
Sugars: 0 grams

Fiber: 0 grams

Muskrat, 3 ounces
Calories: 199 calories
Fat: 10 grams
Protein: 26 grams
Sodium: 103 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Northern Pike, 3 ounces
Calories: 96 calories
Fat: 1 gram
Protein: 21 grams
Sodium: 42 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Opossum, 3 ounces
Calories: 188 calories
Fat: 9 grams
Protein: 26 grams
Sodium: 49 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Rabbit, 3 ounces
Calories: 147 calories

Fat: 3 grams
Protein: 28 grams
Sodium: 38 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Raccoon, 3 ounces
Calories: 217 calories
Fat: 12 grams
Protein: 25 grams
Sodium: 67 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Squirrel, 3 ounces
Calories: 147 calories
Fat: 4 grams
Protein: 26 grams
Sodium: 101 mg
Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Trout, 3 ounces
Calories: 128 calories
Fat: 5 grams
Protein: 19 grams
Sodium: 48 mg

Carbohydrates: 0 grams
Sugars: 0 grams
Fiber: 0 grams

Nuts

Almonds, 1 ounce
Calories: 163 calories
Fat: 14 grams
Protein: 6 grams
Sodium: 0 mg
Carbohydrates: 6 grams
Sugars: 1 gram
Fiber: 3.5 grams

Brazil Nuts, 1 ounce
Calories: 186 calories
Fat: 19 grams
Protein: 4 grams
Sodium: 1 mg
Carbohydrates: 3.5 grams
Sugars: 1 gram
Fiber: 2 grams

Cashews, 1 ounce
Calories: 157 calories
Fat: 12 grams
Protein: 5 grams
Sodium: 3 mg
Carbohydrates: 9 grams

Sugars: 2 grams
Fiber: 1 gram

Hazelnuts, 1 ounce
Calories: 179 calories
Fat: 18 grams
Protein: 4 grams
Sodium: 0 mg
Carbohydrates: 5 grams
Sugars: 1 gram
Fiber: 3 grams

Macadamia Nuts, 1 ounce
Calories: 204 calories
Fat: 22 grams
Protein: 2 grams
Sodium: 1 mg
Carbohydrates: 4 grams
Sugars: 1 gram
Fiber: 2 grams

Peanuts, 1 ounce
Calories: 161 calories
Fat: 14 grams
Protein: 7 grams
Sodium: 5 mg
Carbohydrates: 5 grams
Sugars: 1 gram
Fiber: 2 grams

Pecans, 1 ounce

Calories: 196 calories
Fat: 20 grams
Protein: 3 grams
Sodium: 0 mg
Carbohydrates: 4 grams
Sugars: 1 gram
Fiber: 3 grams

Pine Nuts, 1 ounce
Calories: 191 calories
Fat: 19 grams
Protein: 4 grams
Sodium: 1 mg
Carbohydrates: 4 grams
Sugars: 1 gram
Fiber: 1 gram

Pistachios, 1 ounce
Calories: 159 calories
Fat: 6 grams
Protein: 6 grams
Sodium: 0 mg
Carbohydrates: 8 grams
Sugars: 2 grams
Fiber: 3 grams

Walnuts, 1 ounce
Calories: 175 calories
Fat: 17 grams
Protein: 7 grams

Sodium: 1 mg

Carbohydrates: 4 grams

Sugars: 1 gram

Fiber: 2 grams

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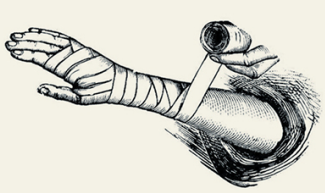

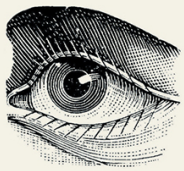

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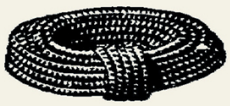

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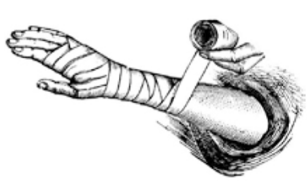

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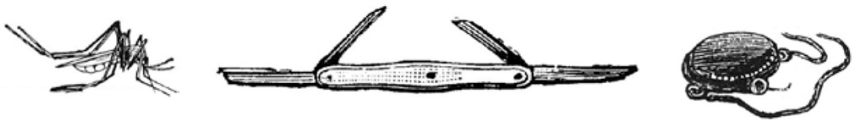

A Field Guide to WILDERNESS EMERGENCY CARE

DAVE CANTERBURY

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DEDICATION

Dave: I would like to dedicate this book to my grandson Jax Conley. Being autistic and nonverbal, he may never have the opportunity to understand the words written in this book; however, it is my hope that this book will prepare others for the task of self-reliance and also aid in their ability to work within a group aiding and/or searching for others. Many autistic children by nature do not understand the dangers of life, like wandering off alone, or realizing, "If I walk into the lake I will drown." But like these children, we are all unaware of many dangers until we have been educated on how to avoid them or to deal with them if the need arises. Consider this a gift that hopefully will educate those who can comprehend these words from Jax and me to the future generations of outdoorsmen and outdoorswomen.

Jason: I dedicate this book to my wife, Robyn, and my children, Ethan, Sydnee, Lindsay, and Daniel, all of whom have allowed me to pursue that which God has laid on my heart to accomplish, regardless of how difficult or harebrained the tasks may have seemed at the time. I hope that as you each hold this book over the years to come that it serves as reminder of the promises of God and His goodness to our family and that by His grace, we have already overcome the world. Never lose heart, and follow your dreams; work hard and all you set your hand to shall be blessed. I love you all.

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Dave: I acknowledge with this fourth volume in the Bushcraft series all those who have taught before me. There are countless people through recent times who have inspired me and taught me invaluable lessons in both life and wilderness living. In no particular order these great men include Mors Kochanski, Steven Watts, David Wescott, Horace Kephart, Hyatt Verrill, Daniel Beard, Bernard Mason, George Washington Sears, and Ellsworth Jaeger. Men who have taught us not only through the written word but also by example that there is no true replacement for actual dirt time, experimental archaeology, and just plain grit to learn a valuable skill. I thank all of you for the contributions before mine and it is my honor to add to the volumes of outdoor guides that lead people to become more self-reliant.

Jason: I would like to acknowledge the emergency services community of which I am honored to be a small part. As a volunteer firefighter, first responder, and search team member I have been witness to hard work, sacrifice, and a sense of honor not often realized by those outside of this community. I would like to acknowledge specifically those who have had a direct hand in my training, without which this book would not have come to pass. William Rearden, chief of Kentucky River Fire & Rescue, has led by example over his twenty-plus years in the fire service. He has been the glue that has held the department together through adversity over the years, and without his leadership the people of Henry County, Kentucky, would have lost much-needed fire protection and rescue services. Mike Buresh,

retired captain of Bluegrass Search & Rescue, whose guidance in search theory, tactics, and leadership has served me well in life beyond the scope of search and rescue. And finally, Michael Payton and Connie Miller, without whose sacrifices my career in Emergency Medical Services would not have begun. Michael Payton, chief paramedic of West Lincoln EMS in Hustonville, Kentucky, passed away in the line of duty in 1998 and it was in his honor that a memorial scholarship was set up by his mother, Connie. I was selected as a recipient of the Michael Payton Memorial Emergency Services Scholarship Fund in 2011 and this gift, given in honor of a fallen brother in EMS, leader in his community, and son of a grieving mother, allowed me to begin my training toward becoming an EMT-B and later an EMS instructor, WEMT, and wilderness emergency care instructor trainer. I am grateful for leaders such as these and others around the world who serve without recognition; may God continually bless your service to your communities, departments, and families.

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Introduction

WHAT IS WILDERNESS FIRST AID?

This book is for people who want to develop bushcraft skills so they can survive and thrive outdoors. One of the most important of these skills involves treating injuries and illnesses in the wild. Given that you probably won't be carrying a full line of splints, bandages, and medicines in your kit, you'll want to be able to use what's on hand to help deal with the problem. Knowing the basics of wilderness first aid can prepare you to be the first line of defense in an emergency.

Wilderness first aid (WFA) refers to the help you give someone who's been injured or becomes sick. It's not (and we can't stress this enough!) a substitution for professional medical assistance. In this book we say repeatedly that if an injury or illness is serious, the victim should be carried out as soon as possible and in a safe way.

What's the difference then between wilderness first aid and regular first aid? If you're performing WFA, you're somewhere in the wilderness; you don't have the option usually of calling the hospital to send an ambulance. In fact, professional medical care may be a long way away—hours or even days. When you're administering WFA,

you’re also dealing with the elements. You may have to splint an arm in a blinding rainstorm or bandage a severe cut during heavy snow. It’s also possible you’ll have to perform these and other actions at high altitudes or in other inhospitable conditions. As you spend more time in the wilderness, you’ll start to recognize that some kinds of physical injuries happen more often—for instance, it’s not uncommon for people hiking to come in contact with a poison plant or suffer hypothermia. Because it may take time for rescue or transport to be arranged, you will almost certainly have to do more than you would if you were providing traditional first aid.

Where this book differs greatly from other books and training courses designed for WFA is in the treatment of common injuries and ailments. Most courses are designed using industry-standard equipment made for first aid such as bandages, burn creams, activated charcoal, and SAM (structural aluminum malleable) splints. However, the typical outdoorsman does not carry such items on a regular basis.

Therefore, this book has been designed to make use of items found within the typical outdoorsman’s daypack as well as those found in nature. We call these items the Ten Cs—the items that anyone planning to go outdoors for hours or more at a time should have in case of an emergency or survival situation. With these ten simple items and the addition of medicinal plants, you will be able to effectively manage the most common injuries and ailments that occur in the outdoors. See “The Ten Cs” discussion in Chapter 2 for more information.

By preparing and practicing ahead of time, you’ll be ready to cope in the event of a medical emergency.

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Chapter 1

KNOW BEFORE YOU GO

“Nature never deceives us; it is always we who deceive ourselves.”

—JEAN-JACQUES ROUSSEAU

You’re walking along a trail when you nearly step on a snake. It darts out its head and bites you on the leg. What should you do?

You’re at camp chopping firewood for your evening campfire. The axe slips and gashes your leg. How can you stop the bleeding?

While cooking dinner over the fire, you pick up a hot pan and burn your hand. What’s the best treatment?

These are all situations you may encounter in the wilderness, and all of them require knowledge of first-aid techniques. But treating injuries and illnesses in the wild isn’t something you should attempt without a little planning and education. Being prepared means you are more likely to stay calm and to do the right thing.

DEVELOP AN EMERGENCY PLAN

You've probably had a discussion with your family about what to do in the case of a fire, tornado, or hurricane—emergencies that may happen at home. You should create a similar emergency plan for when you're in camp:

- Let people back home know where you'll be and when you're expected back—so that if you don't show up, they'll know something's wrong.
- Create a buddy system to help prevent someone from wandering off from the group, especially if you'll have children with you.
- Get to know the general area where you'll be staying and agree on where you'll meet if members of your group will be splitting up.
- Check the forecast and agree on what to do if extreme weather comes along.
- Find out how to get to the nearest first-aid station, ranger station, or hospital before you do anything else and have an understanding of how long it may take for those responders to reach you in the area you've chosen to explore.
- Ensure each person, including youths, are carrying emergency gear and are familiar with how to use it.

HANDLING STRESS

Anyone who's been injured while out in the wild knows that all the stress you feel in such a situation is magnified. You're a long way from civilization, there's no doctor around, and you're struggling with pain (and quite possibly a significant trauma either in the form of blood loss or something else). It's well known that psychological and emotional stress can complicate and aggravate the physical symptoms of an injury. Those involved may also feel guilt for having contributed in some way to the emergency or for

not preventing it. This is particularly so if the injured person is a friend or family member.

When the injured party is a close friend or family member, we often act in one of two ways: we don't take the injury or illness as seriously as perhaps we should because we know the person so well and expect him to "suck it up," or we overreact and create unnecessary panic at the presence of what we believe to be an abnormal amount of blood lost or deformation of a limb. If you're the one administering first aid, be reassuring and calm. You can communicate this to the victim by your manner as well as your words.

Applying this mentality to everyone, even those closely related to you, will prevent you from panicking. Losing your calm is the worst thing you could do as it may lead to you making poor decisions or feeling as if you can't act at all. If you train ahead of time, you will feel more confident when an emergency arises.

In an emergency situation, take a few deep breaths and concentrate on what you need to do right now to solve the problem. Making an immediate plan of action will help you focus and get your mind off fearful thoughts. Don't worry about what will happen tomorrow or next week.

In a group, it is common for one person's panic to spread to others. If the person panicking is not the injured party, ask him to take some deep breaths and calm down. Appoint another person to help keep the group calm. If this doesn't work or you don't have time, you may need to ask the panicking person to leave the area. In general, if you stay calm, it will help others around you stay calm.

If the person panicking is the injured party, you will need to calm him down as you give treatment. Encourage deep breaths (if appropriate) and help him focus on the positives of the situation instead of dwelling on worst-case scenarios. If possible, ask another group member to help keep the injured person calm. Tell the person involved what you're

doing. Don’t be dismissive, since the victim is in pain and may be in shock. You want to project an air of calm, reassurance, and competence.

If the injured person is conscious and understands what’s going on, ask her for opinions about her treatment. You don’t always have to follow her recommendations, but the more she’s involved in the decisions you make about her care, the more she’ll be comfortable with what you’re doing.

INFECTIOUS DISEASE PRECAUTIONS

Keep in mind that when you’re giving first aid to someone, you’re in some danger of being infected. Viruses and bacteria live in blood and saliva and can give you such diseases as hepatitis, tuberculosis, pneumonia, and hard-to-treat skin infections.

For this reason, check your hands to make sure you don’t have any open wounds or sores before beginning the physical examination of the victim. If the victim is coughing, keep your face away from him and try to avoid breathing in any sputum. Germs are tiny, but they can be deadly, and it’s best to assume that the person you’re treating is capable of infecting you unless you take precautions.

But how are you going to treat an injury if you can’t touch the victim? The same way a doctor does: by insulating yourself from the patient. Of course, you don’t have a surgical gown and mask, but the most important thing you can use is nitrile gloves. In your first-aid kit also pack some protective glasses or goggles and a couple of face masks. If you don’t have these items, use trash bags or sandwich bags in place of gloves and improvise safety glasses using sunglasses or reading glasses. You can tie a

bandanna around the lower part of your face and mouth to serve as a mask against germs.

HELPING AS A TEAM

When you are with a group and an accident or illness occurs, it's important for one person to take charge to prevent confusion. If there is a designated group leader or medic, you should follow that person's directions. When there isn't a group leader—such as on an outing with friends—the task of dealing with the emergency usually falls to the person who is keeping a level head. If that's you, then don't be afraid to take charge and to assign roles to other group members.

If the emergency is serious, one person should be tasked with organizing evacuation while someone else treats the injury. If possible, another person should be assigned the role of helping the caregiver. This might mean fetching supplies or keeping the injured person calm.

PRACTICAL SCENARIO

Let's say you go on a mission trip with your local church. You know those on the trip fairly well, but they're not your closest friends. One day during your outing through the jungle of Honduras, one of your teammates suffers a cut on his arm from a machete. The cut is bleeding pretty seriously. You know that direct pressure can help slow or stop the bleeding, but your first-aid kit and the team medic are miles away in another village. What do you do?

ANSWER

Irrigate the wound with potable water to clear away any debris such as plant material. When a proper irrigation syringe is not available, remember: the solution to pollution is dilution. This means you flood the area with clean water to flush out debris. You then remove any imbedded material such as dirt or bark by using the tip of your knife blade, a multitool, or even a toothpick.

Once the area is cleaned, apply a clean cotton dressing over the wound such as a bandanna or T-shirt, followed by firm direct pressure for the next fifteen minutes. Elevating the arm will also help stop bleeding. After fifteen minutes, check the wound to see if bleeding has slowed or stopped. If it has slowed, you may continue to apply direct pressure for another fifteen minutes or create a pressure dressing by tying another piece of material over the wound, making sure the knot or tightest part of the

tied material is placed over the injured area. This will free up your hands so you can further treat the injury if necessary or help with evacuation.

If the bleeding has stopped, reinforce the dressing by adding more. Immobilize the limb so that it does not flail about and is not in danger of being bumped during evacuation, which could cause the wound to open again. (See Chapter 6 for details on creating an immobilization device in the wilderness.)

Knowing the person doesn't change the need for infectious disease precautions.

FIRST AID FOR YOURSELF

Imagine . . .

You're out by the lake alone at dawn when you accidentally stick the fishhook through your hand. Or you're hiking with friends but they get ahead while you're exploring a side trail. You slip and fall, twisting your ankle. You're hurt and you're on your own. Now what?

These are fairly frequent occurrences among outdoorsmen. So it's crucial to know how to take care of yourself.

First aid when applied to yourself is known as self-aid and should be considered the cornerstone of your first-aid training. After all, if you cannot properly care for yourself, why would you think you could care for someone else? Worse yet, if you and a friend both get injured, knowing how to care for yourself so that you can also care for your friend is a vital skill.

When *you're* the injured person, it's crucial for you to remain calm and act rationally because a momentary lapse in judgment could create a dangerous situation that you may not be able to address in a remote location without proper medical care.

While the treatments for various injuries and illnesses are the same whether you're treating yourself or someone else, treating yourself adds a level of complexity to the process. You're in pain, your mobility may be limited (you can only use one hand to get the fishhook out of your other hand), and you can only do one thing at a time. Throughout

this book, sidebars will give additional information for treating injuries when they've happened to you.

The most important thing to remember is to keep calm. Then, assess the situation and make a plan. Can you call for help first, or do you need to stop the bleeding before doing anything else? Are you safe where you are or do you need to get to a more secure location before treating yourself? Though it can be challenging, with knowledge and the right attitude, you can give yourself appropriate first-aid treatment for many common emergencies.

SELF-AID

Remember one important thing: most of us begin any journey dehydrated to some degree. That's because the majority of us do not drink enough water daily. The chance of becoming ill from dehydration only increases when you are performing other tasks or caring for someone else and you forget the simplest preventative measures.

You should drink 64 ounces of water per day under normal circumstances. This volume increases with physical activity. If your urine isn't clear or pale yellow, you're already dehydrated to some degree (unless you're on a medication or vitamin that colors your urine). If you're not urinating at least every two hours, it's a sign that you are already dehydrated. This simple issue gets more students at our bushcraft school into trouble than any other single factor.

REDUCING THE LIKELIHOOD OF ILLNESS

While much of the material in this book focuses on accidents and injuries, being ill in the great outdoors can be dangerous, too. While you'll survive a case of the sniffles even without a nasal decongestant and chicken soup, a bout with pneumonia may cause a lot more trouble.

Just because you're in the wilderness doesn't mean you should be any less clean-conscious than if you were in your home. Wash your hands before eating, keep your utensils and dishes clean, and be sure to wash your hands after going to the toilet.

Check food before you eat it to make it hasn't gone off. Getting a case of food poisoning in the wild will really put a

crimp in your trip. If you need certain medications, make sure you have them with you, as well as a backup supply that you can easily get to if your daypack gets lost overboard when your canoe capsizes.

TIPS AND TRICKS

- Wood ash makes an excellent soap substitute. Use it to wash your hands to kill bacteria and eliminate odors. You may also use it to powder your feet or use it under your arms for the same purpose and use it to powder your thighs if you are prone to chafing.
- Give yourself a limited window of time to be late back home—no more than three hours. In the event you do become seriously injured, the sooner someone comes looking, the better.
- Pour out 1 cup, 1 liter, and 2 liters of colored water on a hard surface such as your driveway, then on the ground so you become familiar with blood loss amounts and what they look like. Depending on how big you are, your body has between 4.5 and 5.5 liters of blood. Lose a quarter of it, and you could die.
- If you are exerting yourself a lot and not resting properly, your immune system will suffer. Carry Emergen-C packets or a similar vitamin C supplement, or make pine needle tea from shortleaf pines to add vitamin C to your system as an immune booster.

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Chapter 2

SURVIVAL SKILLS FOR THE WILDERNESS

“The more injuries you get, the smarter you get.”

—MIKHAIL BARYSHNIKOV

Many times injury and illness in the wilderness can be prevented with proper preparation. If you have planned appropriately, packed your kit effectively, and understand the risks, you can often avoid emergency situations. The best treatment is prevention! With that in mind, let’s look at some of the most important things you can do to prevent injury and illness.

THE TEN CS

The Ten Cs are the basic tools that an outdoors person should always take with her or him. The first five items are considered the most important because they are the most difficult to re-create in the wilderness. With the proper learning curve and skill level, you should be able to re-

create the last four Cs of the first five with your first tool, the knife.

BUSHCRAFT TIP

The Pathfinder System was developed by Dave Canterbury, one of this book's authors, who has more than twenty years of bushcrafting, outdoor self-reliance, and primitive-skills experience. As a hunting guide and experimental archaeology buff, Dave started thinking about what a person should have with him and what he should do in case of emergency. He sifted through archaeological and academic journal resource materials to discover what items were common cross-culturally among people who lived from the landscape. He put in the time, testing the skills and equipment, and developed the Pathfinder System. This system trains the beginner or experienced outdoorsman, bushcrafter, or adventurer in outdoor self-reliance, primitive skills, and survival skills. The system is designed for anyone who wants to learn these skills: the hunter, fisherman, trapper, hiker, search and rescue (SAR) and law enforcement professionals, or anyone who enjoys the outdoors. You never know when you may become lost or stranded, and with the invaluable skills taught by the Pathfinder System, you can survive an emergency situation. The Ten Cs are part of this system. More about the Pathfinder System can be found in *Bushcraft 101*.

The first five (most important) items are:

1. Cutting tool (knife)
2. Combustion device (ferrocerium rod, cigarette lighter, or magnification lens)
3. Container (stainless steel bottle or canteen)
4. Cordage (bank line or paracord)
5. Cover (emergency survival blanket or 3-millimeter-thick, 55-gallon drum liner)

With these five items alone you can effectively overcome, with some effort, adverse outdoor conditions. When applied to first-aid use, these items give you a way to create a shelter, treat shock, make splints and tourniquets, control bleeding, boil water, irrigate wounds, and more.

The remaining five items are designated as comfort items. While not comfortable in the traditional sense, these items make survival a little easier.

1. Cotton material (3' × 3' cloth or bandanna)

2. Candling device (headlamp)
3. Compass (orienteering style with mirror and magnification lens)
4. Cargo tape (Gorilla Tape)
5. Combination tool (multitool including an awl)

With these remaining items, you gain the ability to work in low-light conditions, find your way, make bandages and dressings, close wounds, treat minor burns, and much more.

By mixing these core kit items with a little ingenuity and bushcraft skill, you will learn to treat common injuries in the wilderness and better aid in the process of rescue and evacuation.

DRESSING FOR SURVIVAL

Among the most important things in preparing to go into the wilderness is to make sure that you're wearing appropriate clothing. Here are some basic tips:

- The best fiber to wear is wool, especially if you're camping in one of the colder months. It can absorb water without feeling wet immediately and it'll continue to protect you from the cold. Wool that's tight woven will keep you warmer than synthetic fibers.
- Generally avoid cotton. As soon as it gets wet it loses any insulative qualities, and in any case it's not going to keep you very warm. However, if you're going to be hiking in a desert or some other dry, hot place, cotton is a good option. You can drench your T-shirt, and it will keep you cool while the water evaporates.
- One great advantage of synthetic fibers is that they don't absorb as much water as cotton or nylon; they also dry much faster than natural fibers. That said, they can be

hazardous to wear near a fire, since the fabric might melt and burn you.

LAYERING

When outdoors, dressing in layers helps you stay protected even as the weather changes. The heavy long-sleeved shirt that was the right choice in the dawn hours could become quite uncomfortable under a blazing noontime sun; the T-shirt that was fine for eating lunch at a picnic table can turn out to be a bad idea when a sudden rain shower moves in.

Layering also gives you flexibility as you perform various activities throughout the day. The sweatshirt that was the right choice for quietly fishing under the shade of an oak tree might be too heavy for a vigorous hike, making it more likely that you'll overheat and potentially cause a medical problem.

By layering, you can easily put on or take off clothing as needed to suit your current circumstances. Think in threes: an inner layer, a middle layer, and an outer layer. The inner layer is generally a lightweight fabric that keeps moisture (sweat) away from your skin to help you stay comfortable. The middle layer provides insulation and some protection from the elements (for example, a long-sleeved shirt that keeps the sun and bugs off your skin). The outer layer protects you from water and wind.

In the summer months, the inner layer might be a T-shirt, the middle layer might be a lightweight long-sleeved shirt, and the outer layer might be a lightweight rain jacket. In winter, the middle layer could consist of several pieces of clothing to help you stay warm. In terms of insulation, it is generally better to have more layers instead of thicker layers; the air trapped between each layer contributes to the insulating value of your clothing. See Figure 2.1.

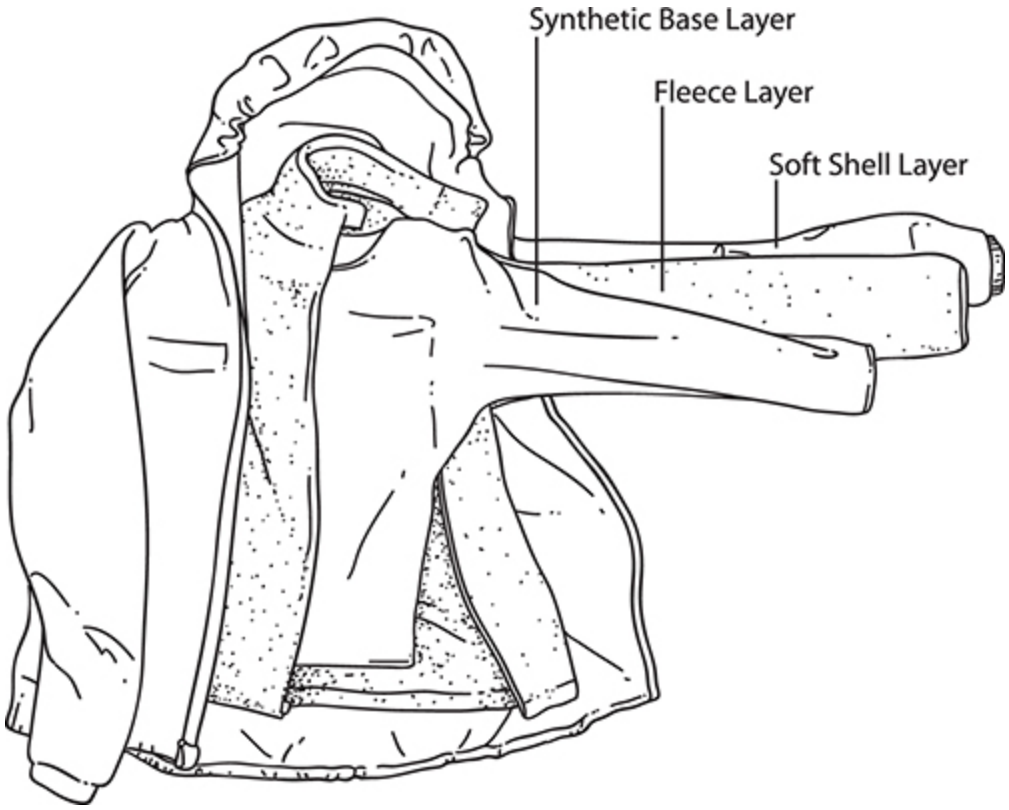

Figure 2.1. Example of a three-layer alpine clothing system

FIVE-MINUTE FIRE

Fire can mean the difference between life and death in an emergency situation. Weather conditions will affect fire making, and being able to produce a sustainable fire with marginal materials in a variety of weather conditions is an important skill.

THE SURE-FIRE FIRE STARTER

We recommend that you carry a “sure-fire” fire-starting product such as Mini Inferno or Micro Inferno. Natural sure-fire tinders include pine-resin-laden fatwoods and birch barks. Even if they’re wet, these kinds of tinders will burn and help you get a fire going, even if some of the firewood and kindling is damp.

We also recommend that you carry several methods of sparking a fire. The traditional cigarette lighter will fail in extremely cold or wet and windy conditions, but a ferrocerium rod, which is made of various mischmetals (an alloy of rare earth metals) and magnesium, will provide thousands of strikes in any weather condition with a shower of sparks as hot as 3,000°F. See Figure 2.2.

Figure 2.2. A student striking a ferro rod with the back of a knife blade

Your objective for WFA and survival purposes is to be able to create a sustainable fire in five minutes or less. A sustainable fire is a fire that is burning fuel of at least 1" in diameter, which means you can walk away for a moment and not fear the fire suddenly going out. There are many reasons you want to be able to make a fire within five minutes, but the most common is for hypothermia prevention. The longer it takes to make the fire in hypothermic conditions, the harder it will be to make, as your body will begin to shut down. That also means

potentially crucial time will be lost before you can rewarm frostbitten extremities and drink water, which may need to be boiled first.

TINDER SELECTION

Tinder selection is important when it comes to making a fire quickly. Tinder is not your “sure-fire”; it is a means to effect sure-fire. Ideally tinder is dry natural material from the surrounding landscape. Cedar bark, fibrous plants, tall dead grasses, pine needles, and wood shavings are all viable options. Kindling is comprised of sticks ranging in size from the diameter of pencil lead up to about 1" thick. This is the material you will use to create fast, intense heat to combust your fuel sticks. The amount of kindling you collect should be about the size of a basketball, a pile you could carry under your arm.

BUILDING A BIRD’S NEST

The first step is to create a “bird’s nest” with these materials. Your sure-fire device is the “egg” in the center. The size of the nest will vary depending on your experience level, but for true emergency situations such as survival or WFA, remember, “As big as your head, or your fire is dead.” This means you want a bird’s nest as big as your face to give your sure-fire the best conditions possible to create a decent flame capable of combusting your kindling. See Figure 2.3.

Avoid putting on more fuel until the flames reach a height of at least 2" above what’s currently burning. This will happen quickly if you have laid your fire properly. Once this occurs, you’re ready to add your fuel sticks, and you are on your way to having a sustainable fire capable of staving off hypothermia, boiling water, and much more.

Figure 2.3. A student with kindling placed over bird's nest

Practice makes perfect, and fire making is something you've got to be good at in the wild. The more you work at it, under different conditions and at different times of the year, the better you'll get. At the heart of fire making is understanding what the fire needs—is it fuel or oxygen? Spend time before you build your fire thinking about the optimum place to put it. It should be far enough from your shelter not to pose a fire hazard but not so far away that you can't easily utilize it and tend to it.

FIVE-MINUTE SHELTER

Besides fire, a well-constructed shelter is essential for survival in the wild. It can take just a few hours of exposure for the body to begin exhibiting symptoms of hypothermia (too cold) or hyperthermia (too hot)—and it doesn't take more than a few minutes to risk sunburn or frostbite. It's

essential to know how to quickly create some sort of shelter. Not only will you be shielded from snow or rain, you can also control—to some extent—the temperature inside, which is important when treating injuries such as frostbite.

An important item in your pack in this regard is an All-Weather Emergency Blanket or SOL Emergency Blanket. Using a rope, create a ridgeline between two trees. The rope should be at waist height. Then attach the front corners of the blanket to the rope and secure the rear corners on the ground. Now you have a lean-to in which you can move the patient. Make sure to place the reflective side of the blanket down to maximize heat retention. See Figure 2.4.

Figure 2.4. A student setting up a five-minute shelter

Since in most circumstances it will be important to keep the patient warm, build a fire one large step directly in front of the shelter (make sure the flames don’t come in contact with the blanket). Construct a reflecting wall from rocks or logs behind the fire. If your object is to get the patient into a cooler environment, turn the reflective side of the blanket outward.

FIVE-MINUTE WATER BOIL

After you have set up a shelter and started a fire, the next step is to boil water as quickly as possible so you have potable water to treat injuries and rewarm and feed the victim. You don’t have much time here. Fortunately it’s pretty simple to boil water quickly if you know what you’re doing. Fill a container with water (stainless steel bottle or canteen). Take off the lid and use the stove base or a couple of green sticks (wood that has been recently cut and hasn’t dried out, making it less likely to burn) to raise the container about 2" off the ground.

Doing this will permit air to pass under the container and help it to superheat. Prop sticks over the container, imitating a tepee, and surround the container with more kindling. This will also help heat the water quickly.

Once the water has boiled, allow it to cool. Hanging it from a toggle will help speed this process.

In all, all of the steps listed here (building a shelter, building a fire, boiling water) shouldn’t take you more than fifteen minutes; with some practice you can probably get it down to seven or eight. Spend the time mastering these skills. They can save a life in the wilderness.

COMMON OUTDOOR INJURIES AND ACCIDENTS

Many common outdoor injuries and accidents could be prevented with planning. Some of the most common problems are:

- **Breaks, sprains, and strains.** Falls are a common cause of injury, especially when crossing uneven or rocky areas. You don't even have to fall to break an ankle—sometimes just a misstep will do the trick. The National Institutes of Health reports that about 70 percent of all nonfatal wilderness injuries are breaks, sprains, and strains. Make sure you have appropriate footwear, and don't be in a rush when conditions are wet or otherwise dangerous. Don't hike in the dark, and do ankle- and knee-strengthening exercises before you set out.
- **Weather-related illnesses.** Hypothermia and hyperthermia can be prevented with proper clothing and shelter, plenty of fresh, clean water to drink, and a careful eye on the weather forecast.
- **Sunburns and rashes.** Use a good sunscreen and apply it frequently throughout the day—you can get sunburned even in winter months if you're outside all day. Don't touch plants with bare skin unless you're sure they're not poison ivy or another plant that will leave you itching.

BUSHCRAFT TIP

According to the National Institutes of Health, falls and drowning are the most common causes of death for people exploring the wilderness. Use special care when hiking and climbing and when near water.

USING PROPER GEAR AND TECHNIQUES

Accidents and injuries commonly occur when people use incorrect gear and techniques to perform a task. For example, when striking a ferro rod, do so with the back of

your knife, not the blade. Using the blade risks a bad cut should the knife or the rod slip.

Reduce the likelihood of injuries by always keeping cutting tools sharp; dull tools have a tendency to slip and do more damage. Keep sharp tools properly covered, using masks for axes and sheathes for knives. Never leave them lying about your camp location unprotected. Take care to choose your footing wisely while on the trail, and clear trip hazards from your working area while in camp.

Wear proper protective clothing. In spring and summer it can be tempting to wear shorts and a T-shirt but (depending on what you'll be doing) it could be asking for injury and infection. Always overdress with protective long pants and sleeves so that you can adjust to the environment. This will also help prevent sunburn. A wide-brimmed hat will be an asset to you on many occasions, such as during sudden rain or on extremely sunny days.

To understand how to use your gear correctly and sharpen your skills, practice at home before you go off into the wilderness. Mistakes will be less dangerous and easier to correct.

STAYING SAFE WHILE IMPROVISING

That said, half of the fun of being outdoors is learning how to improvise—to make use of what's at hand instead of trekking it all in. The key is in knowing how to improvise safely, which means understanding your materials and the environment.

For example, you may think that setting your kettle on a rock in the middle of your fire means you won't have to carry in a campfire tripod, but a wet rock placed in a fire can explode. Spend some time learning about the environment before you put it to work.

KNOW YOUR LIMITS

Being an outdoorsman often means pushing yourself to do more than you thought you could do. But going past your limits is a common cause of injury and illness. “Just one more mile” in the bitter cold can lead to hypothermia, and “I think I can jump across this creek” can lead to a bad fall. Knowing what your physical limits are can help you enjoy your wilderness experience instead of suffering through it.

Preparing ahead of time (for example, by doing strength- and endurance-building exercises) can help. If you must push your limits, make sure a buddy is with you in case you need help.

TIPS AND TRICKS

- Quaking aspen trees produce a chalky dust called bloom that is useful for sunscreen with an SPF of about 5. It has been documented as being traditionally used by Native Americans.
- Bic-style cigarette lighters will generally fail in temperatures less than 32°F. This makes a good temperature gauge. The lighter can be made usable easily enough by warming it with body heat for a few minutes.
- You will see your breath at 40°F. This can help you gauge how cold it is.
- Punk woods from soft trees in the aspen family will readily ignite to an ember with a magnification lens as long as the materials are dry.
- You can easily insulate the ground inside an emergency shelter by stuffing a 55-gallon drum liner with dry materials such as weeds and grasses and compressing it into a flat layer about 4" thick.

- Wearing boots that do not lace can be a blessing in disguise to many folks: there is less chance of getting poison ivy on the hands, they are easier to put on and remove if one hand or arm is injured, and if you get your boot stuck in mud or rocks for some unfortunate reason, you can slip the foot out.

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Chapter 3

THE EMERGENCY SCENE

“Injuries obviously change the way you approach the game.”

—BRETT FAVRE

When you need to give first aid to someone in a wilderness setting, often you know exactly what happened and how because you were there when it occurred. But sometimes you don’t know—your friend is off gathering firewood when you hear a shout, or perhaps you come across someone sitting by the side of the trail you’re hiking up. In those cases, you don’t always know what has happened or how, so you need to assess the situation before trying to treat the injured or ill person.

FIRST APPROACH

When you’re walking toward someone who’s been hurt, it’s only natural if you feel your heart beat faster and your palms start to sweat. It’s a very stressful situation, and your body is producing adrenaline to help you cope. What you’ve got to do is internally talk yourself down. There’s no

good reason to rush, and doing so may cause more harm than good. Stop if necessary to take a couple of deep breaths and remind yourself that you're there to help.

If you don't know the person, take a moment to introduce yourself and ask permission to help. Tell him or her that you're trained. The more you can do at this early stage to induce confidence in the victim, the easier your job will be.

As you approach, survey the scene to make sure there are no hazards that could affect you and to look for what caused the injury.

LOOK AROUND YOU

Unless you stay safe, you won't be able to help others in their time of need, and you may suffer a serious injury yourself. While counting slowly to ten, look all around you, taking in as much detail as possible. Something as simple as twisting your ankle can mean you lose the ability to help the injured person. Leaning trees, loose limbs overhead, loose or falling rock, water hazards, animal hazards, hazardous materials, and storm hazards are some of the most common issues.

The world isn't going to stand still while you're administering first aid. All kinds of things can happen: other people may come on the scene and want to help; animals may show up to investigate; or weather conditions may suddenly change. This can interfere with your continued safety (and that of the person you are treating). So throughout your time on the scene, continue re-evaluating it.

For example, if you find that a swarm of hornets is buzzing about an unconscious person, you may not be able to approach her right away without succumbing to multiple stings, which could lead to your own emergency situation. Similarly, if you determine that a patient has been struck by

a widow maker (a broken-off treetop or limb) and you identify more in the area, you should move the injured person out of harm's way before beginning your assessment since one gust of wind the wrong way could lead to another widow maker falling—this time on you!

PRACTICAL SCENARIO

As you're hiking along your favorite trail, you notice an individual lying across the trail, apparently unconscious. As you continue your approach, you shout out, asking if he's okay while scanning the area for obvious hazards such as fallen limbs and loose debris signifying he may have tripped and fallen or obvious animal sign. You detect an unnatural odor of cucumber in the air. Upon reaching the patient, you notice two punctures on his ankle—denoting a snake bite. What should you do?

ANSWER

Certain snakes such as the copperhead emit a musk when touched. A strong odor of cucumber, which is what this musk resembles, would indicate the snake is still in the vicinity. So, your first reaction should be to inspect your surroundings and carefully move the injured person in case the snake has taken refuge under his collapsed body. In the event you cannot locate the snake but still perceive it to be close, it may be a good idea to move the person a short distance away to safety before administering first aid.

RESCUING AN INJURED PERSON

Sometimes an injured person is in a situation requiring rescue, not just treatment. For example, if a hiker has been hurt by a falling tree limb, he or she might still be trapped under it. Or, in a more dire scenario, you might recognize that someone is drowning and needs to be pulled out of the water.

- First, remember that you should never jeopardize your own safety to help someone else.
- Call for help if possible.
- Be aware that "rescue action" and "giving first aid" are two different things under the law. If by rescuing a person (for example, pulling him out of a vehicle after an

accident), you create or worsen an injury, that is different from potentially causing or worsening an injury while giving treatment (for example, if the tourniquet you apply is too tight). While Good Samaritan laws can protect you in the latter case, they won't necessarily protect you in the former.

- Don't move an injured person until you've had a chance to determine the extent of her injuries, unless the hazard of leaving her is potentially life-threatening.
- Sometimes treatment and rescue have to happen at the same time. For example, the pressure of a tree limb that has trapped an injured person's leg might be minimizing the bleeding. When it is moved, the bleeding will worsen, and you will need to take immediate action to stop it.
- If you suspect someone in the water is in distress and possibly drowning, remember that your first move shouldn't be to jump in the water yourself to save him. If you can reach him without being pulled into the water yourself (hold on to something stable), try that. Or, throw him a flotation device to hold on to. If neither of those options will work, row or swim out to the person using some sort of flotation device (an inner tube, a canoe).

BUSHCRAFT TIP

People who are near to drowning don't splash around in the water calling for help (although a tired or distressed swimmer may do this). Someone in the state of *active* drowning can't even reach for a nearby flotation device. Signs of active drowning include the head being low in the water and tilted back, eyes closed or glassy (not focusing), and not using the legs. The most counterintuitive aspect of drowning is that the swimmer may not seem in distress. If you suspect someone is in trouble, ask, "Are you all right?" If the swimmer can answer, she is probably okay. If not, then she needs help.

MECHANISM OF INJURY

While you're looking around the area where the person was injured, try to pinpoint the particular things that caused the

injury. For instance, you may see some fallen rocks that struck the victim. Or you may notice a clump of poison sumac that the person came into contact with. Weather can be a factor as well. Assessing *how* the injury happened ("mechanism of injury") can help you determine what the injury actually is and how serious it is likely to be.

Even a short fall—for example, from 3'—can do serious harm. When someone falls more than three times his own height, he's probably injured his spine. If the victim has suffered blunt trauma above the clavicles, it's very possible she's injured her cervical spine. Therefore, someone who falls and hits her head could also have damaged her cervical spine.

Remember to keep animals and insects as part of your calculations. If the victim disturbed a hive of yellow jackets and suffered multiple stings, the area is probably still hazardous. The same is true of bites from an animal. In these cases, your first priority is to get the victim away from the site of the injury. You may first have to wait out the animal or insect swarm before you enter the scene. An enraged animal or swarm will seek to defend its den or area, which will likely result in you becoming injured yourself. If there is an opportunity to remove the injured person from the active site, do so as long as it does not put you in immediate danger.

Use your common sense when evaluating the mechanism of injury. Remember the old adage, "If you hear hoofbeats, think horses, not zebras." Someone sitting by the trail holding her ankle probably isn't suffering a heart attack.

By the same token, if the injuries don't seem congruent with what you would expect, then take a mental step back and reassess. For example, if someone has taken a fall and you expect skinned knees and maybe a sprained ankle, but he is vomiting blood, something else has happened.

Determining the mechanism of injury is the detective portion of the scene assessment. By evaluating clues both

objective and subjective you can determine the course of immediate care.

PRACTICAL SCENARIO

You are driving your four-wheeler on a trail and you find a side-by-side collision at an intersection of the trail. Three people are out walking around the accident scene. As you approach the scene, you see there is considerable intrusion into the front end of one of the vehicles with a badly bent frame. You also notice there is a rear passenger compartment wherein a crying boy is being cared for by his father, neither of whom is wearing a helmet. You discover that the other three individuals are two hikers and the driver of the other vehicle, whom you are told is “fine.” What should be your first course of action?

ANSWER

The first thing you should do is appoint someone to call 911. One of the hikers is ideal since they are not directly involved in the emergency. What type of injuries might you expect to find in an ATV collision in which the occupants were not wearing helmets and one vehicle suffered significant frame damage? Likely injuries to the head, neck, spine, hands, arms, and knees, and potential blunt force trauma to the thoracic cavity.

Because there is a child involved, with a parent already providing some sort of care, you naturally begin your assessment there and find that the child banged his head against the front seat and is bleeding from a gash in the forehead, has some blood on the lips, and is having trouble catching his breath. As you further assess the child, the smell of alcohol becomes apparent from the father, who seems to be emotionally shaken and has a knot on his forehead, labored breathing, and abnormally distended neck veins.

As you make this assessment, ask: are there any other hazards to consider? Is there smoke or a smell of gasoline? Is the engine still running or is the vehicle in an unsteady and precarious position? Is there a need for a modified triage system to screen for hidden injuries?

The loudest victim is not always the one in need of immediate assistance. The fact that the boy is crying tells us his airway is open and that he is vocal. A well-trained aid giver would more thoroughly consider the mechanism of injury. In this case, the father and son’s vehicle was without airbags and they were not wearing helmets. The front-seat victim, given the significant mechanism of injury (front-end impact with bent frame), should receive a higher initial priority until injuries are completely ruled out. Therefore it would be better to assess the father and then the crying child. The other driver, who is walking around, should be last on your assessment list. All of this assessment occurs within the first two minutes of your arrival to the scene.

WHERE TO BEGIN?

The first thing to do is to determine if the victim’s injuries or illness is life-threatening. Examine the patient for

trauma by checking vital signs (pulse, breathing, etc.) and seeing how responsive he is. After you've announced yourself, gently touch his shoulder (or some other noninjured body part) and ask if he's all right. Then, determine his level of responsiveness (LOR). The LOR checks the injured person's awareness and ability to communicate.

AVPU

In characterizing an injured or ill person's level of responsiveness, use the AVPU scale.

A = Alert: The person is alert and can speak with you intelligibly. She knows what happened, who she is, and where she is. A few minutes of amnesia after a serious injury are common, but the patient recovers her memory fairly quickly. An alert person will be able to inform you of her condition and describe her injury.

V = Verbal: The person responds to verbal stimuli. She responds to your voice and can answer you. On the other hand, if she grimaces or rolls away from you when you speak, you will need to investigate further and perform other tests.

P = Painful: The person responds to painful stimuli. If you pinch her skin, she reacts. Just as with verbal stimuli, a reaction to pain means that the injured person is responsive, albeit in a diminished capacity. The patient might require immediate treatment before she becomes unresponsive. Further testing may indicate potentially life-threatening conditions.

U = Unresponsive: The person doesn't respond to any stimuli. If unresponsive, the injured person cannot give you any information, so you must rely on your senses and the guidance of your assessment to treat any life-threatening injuries.

ABCS

Once a level of responsiveness is determined you can assess the injured person's ABCs, or airway, breathing, and circulation. The purpose of this assessment is to determine whether or not there are problems with the injured person's airway, to see if he is struggling to breathe, and to figure out if he is losing blood.

A = Airway: Look at the victim's throat for any blockages. In an unresponsive patient, open the mouth and look down into the throat to check for blockages such as blood, food, and spittle, which you may need to remove or manage. If he's talking to you, his airway is open, but it's possible he's having trouble breathing. Ask him if it hurts to take breaths. You may remove blockages by finger sweeping the mouth or turning the patient onto his side into a recovery position (see "Recovery Position" later in this chapter), which will at times allow the material to drain out of the mouth, thereby clearing the airway.

B = Breathing: Labored breaths and noise while breathing, such as rattling or gurgling, could indicate an internal injury. Wheezing/whistling may indicate a puncture to the thoracic cavity.

C = Circulation: If the victim is responsive, take her pulse at her wrist. If she's not responsive, take it at the neck. A normal pulse rate is between 60 and 100 beats per minute. Anything above or below these numbers signifies a medical emergency. Examine her for any significant bleeding, especially her arms and legs. If bleeding is occurring, apply pressure to control it and create a bandage or tourniquet.

VITAL SIGNS

When you're making your initial examination of the victim, one of the first things you'll do is check his vital signs. This means you'll establish his level of

responsiveness, as we discussed previously. You'll also check his heart rate, breathing rate, how well his blood is flowing, his temperature, moisture, and skin color. This will give you an idea of his overall health and point you toward your next steps. Generally speaking, someone who is alert with a heart rate of 72, with cool, normal-colored skin, breathing fifteen times a minute is normal, whereas someone who responds to verbal stimuli with a heart rate of 42, with cool, clammy skin, breathing ten times a minute with wheezing is in need of immediate medical care. Changes in vitals over a period are indications of an alteration in the injured person's condition for the better or worse. When you're checking the patient, if possible jot down in a notebook or some other paper the vital signs you're measuring.

Heart Rate (Pulse)

If your patient is responsive, you can check her wrist for a pulse. If she's unresponsive or too young to understand what you're doing, check her neck. Just below the jaw there's a groove between her windpipe and her neck muscle. One or two fingertips on that spot will give you a pulse. Never reach across the injured person to take a carotid pulse, as the person (or a bystander) may become startled and defensive.

To take a pulse at the wrist, look for the groove at the base of the thumb. Gently press on the area using two fingertips.

A weak pulse is obviously harder to find, so you may need to put a bit more pressure on the artery with your fingers. Use the distal (downstream) finger to do so, but be careful not to press too hard.

A normal heart beats between 60 and 100 times per minute. Rather than listen an entire sixty seconds (at a point where every minute may count), count the number of beats in fifteen seconds and multiply by four. Is the

heartbeat regular? Is it strong? If not, the situation may be life-threatening. Write the pulse rate in your field notes. Higher and lower pulse rates may signify certain medical conditions (which are discussed throughout this book), so having a written record will allow you to better track them.

Circulation

Next you want to determine how the victim's blood is flowing to his extremities—his hands and feet. Press down on the nail bed of one of his fingers. How long does it take for the nail to turn pink again? More than two seconds indicates a problem. (Note that this method works best on children less than six years old.)

Respiratory Rate

Just as your heart normally beats at a given rate, you breathe in and out a given number of times per minute. If your patient is breathing less than twelve times a minute, the situation is life-threatening and you may have to perform rescue breathing. If the patient isn't breathing often enough, other parts of the body aren't getting the oxygen they need, and permanent damage or death can result.

Put your hand on the victim's chest and watch it rise and fall for fifteen seconds. Multiply by four and you know the per-minute breath rate.

In an unresponsive patient, look, listen, and feel for breathing. Look for chest rise and fall, listen for air movement in the chest cavity, and feel for air movement from the nose or mouth and chest. As you did with the pulse, take note of the regularity and strength of the breathing. Adults should breathe between twelve and twenty times a minute.

Skin Tissue Color, Temperature, and Moisture

To check skin tissue color, look at the inner eyelids, lips, and nail beds. Normal skin should be warm and dry. Here are some other things to take note of:

- If the injured person's skin is cool and clammy, he may be suffering from shock or anxiety.
- Cold and moist skin means the body is losing heat.
- Cold and dry skin means the body is suffering from exposure to extreme cold.
- Hot and dry skin means high fever or heat exposure.
- Goose bumps accompanied by shivering, blue lips, and teeth chattering can mean dysfunction of the autonomic system, fear, exposure to cold, or pain.
- Pale skin may mean blood loss, shock, hypotension, or emotional distress.
- Cyanotic (bluish-gray) skin means lack of oxygen and inadequate breathing and heart function.
- Flushed (red) skin means exposure to heat or emotional excitement.
- Yellow (jaundiced) skin indicates inadequate liver function.
- Mottled (blotchy) skin is occasionally seen in patients with shock.

PRIORITIZING TREATMENT

If you encounter an emergency situation where more than one person is injured or ill, you have to decide which person to treat first. Triage, as this assessment process is called, helps you prioritize the most severe and time-urgent illnesses and injuries, treating and stabilizing them before you move on to helping those with less severe or time-urgent problems. Although your first instinct may be just to dive in and start helping, taking some time to make this

assessment increases the likelihood of positive outcomes for everyone involved.

In order of importance are injuries that require *immediate* attention, those that require *urgent* attention, and those that require *moderate* attention. Death is the lowest priority, as there is nothing you can do to help.

- **Immediate attention.** First priority should be given to an injured or ill person who has airway blockage or breathing difficulties, severe or uncontrolled bleeding, or confusion or disorientation.
- **Urgent attention.** After treating anyone who requires immediate attention, treat those who require urgent attention. This would be any injured or ill person who has burns (but an open airway), major broken bones or multiple broken bones or similar injuries such as sprains or dislocations, and spinal injuries (including suspected spinal injuries).
- **Moderate attention.** After treating the more serious injuries or illnesses, you can turn your attention to helping those with less severe problems, including minor breaks or sprains, cuts, scrapes, and bruises.

PHYSICAL EXAM

Now you've come to the physical exam, one of the most important parts of administering first aid. The patient's expressions and sounds as you carry out the exam can be important diagnostic indications, so keep an eye on her face. You'll be looking not only for obvious existing injuries but also for any secondary ones—particularly in the cases where hard trauma has occurred.

This is no time to be polite or shy! Be thorough and don't hesitate about unbuttoning clothing. Look for injuries that may not be obvious but that are causing pain or discomfort.

BUSHCRAFT TIP

Remember that very often the pain of an injury or illness is accompanied by fear, which can be debilitating. Keep your manner calm and encouraging and don't use any sort of catastrophic language around the victim. At the same time, be honest—if a hiker's leg is broken, you're not doing him any favors by lying and saying it's fine. If you're worried that the victim may be panicked by the truth, move the conversation in another direction. By engaging the person in positive conversation you help alleviate stress and build confidence, which keeps both you and the patient calm.

START AT THE TOP

Start with the head. Run your hands over the skull. If there are places that are loose or gravel-like, it could be fractured and what you're feeling are bone fragments. Check if the patient is bleeding from the ears or nose, since this could be related to a skull fracture.

If clear fluid is coming from the skull, ears, or nose, there's almost certainly been a skull injury; the fluid is cerebrospinal fluid (CSF). To check this, dip the corner of a light-colored cloth in the fluid. If the patch dries surrounded by a yellow halo, you've confirmed it's CSF.

The victim's eyes may appear surrounded by dark patches, giving him a look as if he's put on too much eye makeup. This is because blood from the surrounding tissues is spreading to the tissues near the eyes. It may be accompanied by Battle's Sign, which will appear as bruising behind the ear, a sign of a basal skull fracture.

Check the pupils by briefly shining a flashlight in them. Do they react normally to the light? If one pupil is bigger than the other, this is a sign of brain injury.

Now check the mouth. Look to see if the tongue has been injured or bitten off. Are the teeth all still there? Teeth can break in a fall and cut the inside of the mouth. If that's the case, the flow of blood into the mouth can block the airway, creating breathing problems. Can the victim move his jaw? Is there swelling anywhere around the lower part of the head.?

Smell his breath. If you smell a fruity odor, it is a sign of ketoacidosis, an excess of acid in the blood due to an irregularity of insulin typically associated with diabetes.

BUSHCRAFT TIP

People with chronic diseases such as diabetes often wear or carry medical alert information. Look for tattoos and bracelets on the wrist, ankle, or neck. Check the wallet for a medical alert card.

UPPER BODY

Moving down from the head, the next area of examination is the shoulders and chest.

The collarbone is often broken during severe falls. See if the patient can move his arms without pain. If something beneath the skin of the shoulders looks lumpy or out of shape, there's a good chance the collarbone has been broken.

Ribs are another set of bones often subject to breakage. Ask the victim if it hurts to breathe. Stand behind him, placing a hand on either side of the rib cage and ask him to breathe deeply. Are the ribs normal to the touch? Is one side painful or does it not rise with breathing? If ribs are broken, it's possible that one of them (or something else) has pierced the chest wall. This is called a sucking chest wound and can be particularly dangerous, since untreated it will build up pressure until the lungs collapse.

If the patient is coughing up blood, this could signal any number of things, from bronchitis to some sort of chronic condition. If you're hiking at a high altitude, it could be a sign of high-altitude pulmonary edema, and you should get the patient to a lower altitude as soon as possible.

The heart is a muscle, and like all muscles it can be bruised. A severe bruise will cause bleeding in the pericardial sac, surrounding the heart. Although this

condition is treatable, it’s not one you, a nonprofessional, should attempt to deal with in the wild.

BUSHCRAFT TIP

Injuries to young children should always be taken very seriously, since it may take a day or so for them to show symptoms, particularly where heartbeat and breathing are concerned. Keep a careful eye out for this.

ABDOMEN AND PELVIS

The abdomen is next on the examination list. Envision the abdomen in four quadrants. You palpate (press) on each quadrant, feeling for distension (gas released due to organ damage) and rigidity (internal bleeding).

The liver can be vulnerable to injury, which can cause extensive internal bleeding. (This shouldn’t come as a surprise, since the function of the liver is to process your blood.)

If your patient is vomiting up blood, especially if it’s mixed with bile, the liver has almost certainly been damaged. On the other hand, if the blood is mixed with spittle and digestive juices, the victim has been injured in her stomach. If it’s bright red, it’s coming from the esophagus.

After the accident, if the victim goes to the bathroom check (or have her check) her urine. If it contains blood, there’s a chance her kidneys may have been injured. Any sort of internal bleeding issues are cause for concern, since the body will react by sharply contracting muscles, creating considerable pain. As well, the body’s organs, when injured, will try to fight back by releasing microorganisms that can do damage to other parts of the body.

If the victim is pregnant and bleeding from the abdomen or vagina, the fetus or uterus may be injured.

Check the genital area as well; if the patient is male and has an uncontrolled erection after an accident, he may

have suffered a spinal or pelvic injury.

The pelvis should be examined by pressing gently inward and downward on the pelvis bones to detect an injury.

ARMS AND LEGS

After the pelvis, check the legs. Press firmly around the upper bone of each leg (femur) and check for pain reaction. If it seems obvious to you that a part of the leg is injured (for instance, if you can see that the leg is bent at an unnatural angle), examine the rest of the leg first. When you're done, go back to the obvious injury. Pain in the surface tissue surrounding the femur may be so intense that the patient's muscles spasm (called guarding) or the patient refuses to allow you to properly palpate the leg to determine the extent of damage.

Feet are often the site of injuries because we put them through so much in the wild. When you're examining the victim's feet, look at circulation, indicated by their color, temperature, and pulse. The pulse is located in the hollow below and behind the inside ankle bone. If you have trouble finding that one, look between the two tendons on top of the foot. As with all pulses, you should feel them clearly and they should be strong and within normal limits of 60–100 beats per minute. A weak pulse can indicate a lag in blood flow to the extremity caused by interior blockage or exterior damage due to an injury.

See if the injured person can wiggle toes or apply upward and downward pressure with the feet. If the tissues of your feet freeze, you'll lose nerve function as well as circulation.

Follow this same process for the arms and fingers. Make a strength check by asking the victim to squeeze a couple of your fingers with each hand. If there is a difference between the two, one side may be injured or one side of the

brain may be impaired, so further investigation may be required.

If there's no sign of a spinal injury, the next step is to log roll the patient to check her back for injuries. See "Moving an Injured Person" in this chapter for how to perform a log roll. Look for any injuries previously hidden such as blood loss from the back or any abnormalities such as deformities or impaled objects.

DCAP-BTLS

Many people find the DCAP-BTLS system helpful to remember what injuries you're searching for.

D = Deformities: Anything that should not appear on a healthy body
C = Contusions: Bruises
A = Abrasions: Scrapes, etc.
P = Punctures: Holes anywhere on the body
B = Burns: Redness, sunburn
T = Tenderness: Pain or muscle spasms in reaction to touch
L = Lacerations: Cuts
S = Swelling: Anywhere on the body

SELF-AID

You can also perform the examination techniques in this chapter on your own body if you have injured yourself and need to assess the damage. Write down your own vitals and keep track of them as you wait for help. Carry an XXL orange T-shirt within your kit as your cotton material. This item will fulfill all the functions of the cotton material and can also be worn over all your outerwear so you can be seen by a rescue team in the woods should you be immobile, sleeping, or unconscious.

SAMPLE HISTORY

If you're treating someone for a traumatic injury, the SAMPLE history isn't as useful and you can skip it. It's quite possible that the victim won't know all the answers to

your questions, but you can get help from her friends and companions. As always, be calm and never be antagonistic. Your goal is to get information while keeping everyone calm. Make the questions open-ended and try to avoid questions to which the answer is yes or no.

S = Signs/symptoms: What signs of injury or illness have you found?

A = Allergies: Is the patient allergic to anything with which she could have come into contact?

M = Medications: Is the patient currently taking any medications, and if so, what for? Has she missed taking her dosage?

P = Pertinent medical history: Is there anything you and other first-aid providers should know about the patient?

L = Last oral intake: What was the last time the patient ate or drank anything? What was it?

E = Events: What led up to this situation? Was there a specific incident or have the symptoms come on slowly?

KEEP CHECKING

If your patient doesn't have any life-threatening injuries, you should check the ABCs and vital signs every fifteen minutes. This will enable you to make sure the patient is stable. Industry-standard protocol is to keep checking until care is transferred to EMS or other official medical provider. It's important to track any changes in the injured person's status. This is especially true if you suspect the patient has internal injuries such as bleeding, since the body will continue to react to those injuries and you may have to take further steps to stabilize the patient. However, should a person simply have a bruised elbow, it's easy enough to ask how he is feeling a few times per hour or until the initial onset of pain and swelling subsides. Let common sense prevail.

For patients with more substantial injuries such as fractured limbs, burns, or breathing problems due to wounds to the thoracic cavity, reassess every five minutes until additional help arrives.

MOVING AN INJURED PERSON

If someone's been severely hurt, your first concern should be to get him ready for evacuation. This is particularly true if he's sustained a neck or back injury, which makes moving him tricky. Your goal is to get him onto a backboard, which can support his body while you're moving him. To do this, the first step is to get him into what's called a neutral anatomical position. It's highly unlikely that you will re-create the damaging forces it took to injure the victim in the first place simply by moving him into a better position for transport, except in cases of falling from a significant height or being hit by something substantial, but take care to move deliberately and at a slow enough pace that current injuries are not worsened by jerky motions or unnatural rotations. In cases of falls from heights greater than 15' or impacts by large objects such as ATVs and trees, do not move the patient unless absolutely necessary until EMS arrives.

NEUTRAL ANATOMICAL POSITION

As you can see in Figure 3.1, a neutral anatomical position means the victim is lying on his back. His arms are at his side, and his feet are forward. One important concern at this point is to make sure that his airway doesn't have any blockages. You have already checked for this in your initial examination, but take a moment to confirm it. See Figure 3.1.

Figure 3.1. Neutral anatomical position

RECOVERY POSITION

A recovery position can be used when the victim isn’t seriously injured. She should be placed on her side, with her head resting on her arm. She can bend her legs a bit to keep balanced. If she shows a tendency to vomit or cough blood and sputum, this is a good position, since the vomit and other excreta won’t be able to block her airway. See Figure 3.2.

Figure 3.2. Recovery position

LOG ROLL

If you determine the injured person absolutely needs to be rolled on her side in order to be moved or to prevent choking, seek assistance if possible. The more people assisting, the better, because more hands can stabilize the injured person and prevent unwanted spinal motion. If you don’t have help, you had better have a good reason to proceed with the log roll instead of waiting for EMS to arrive—such as an immediate life threat.

Generally at least two are needed for a safe log roll, one to stabilize the head and neck and one to stabilize the lower spine and pelvis. The person stabilizing the head and neck is the person in control, and he is the one who dictates when the roll occurs so that there is no confusion between parties resulting in an alternate twisting of the body.

Figure 3.3. Log roll to check the back for injuries

The person at the head (#1) cradles the head and neck by placing hands at the ears and fingers under the neck while the second person (#2) positions her knees perpendicular to the patient allowing for the patient to be rolled toward her lap. Person #2 places her hands at the shoulder and hip of the patient and at the command of Person #1, pulls the patient in coordinated effort toward her lap, at which time a back assessment for bleeding and deformities is done. Then a backboard, blanket, or tarp is placed under the injured person before she is returned to the neutral anatomical position. This will assist in maintaining core temperature control while awaiting transport. See Figure 3.3.

MOVING A VICTIM

If the site of the injury is hazardous, you'll need to get the victim (and you) away from it as quickly as possible. You may also need to move the injured person if he's

incapable of walking out on his own, either to carry him out or get him to a rescue vehicle. Your key goal here is to be fast, efficient, and above all, not to further injure the patient. It's also a situation in which we can't emphasize enough the importance of remaining calm. It's possible to hurry without seeming hurried. See "Moving Techniques" later in this chapter for specifics on how to move an injured person. If hazardous conditions prevail, you're going to have to very quickly make a decision about whether to move the person—probably before you've even examined him. The methods we'll discuss here are easily mastered ways of accomplishing this.

MOVING TECHNIQUES

The following techniques are some of the most common methods of moving an injured person out of harm's way.

The Clothes Drag

The great advantage of this technique is that it isn't going to wear you out. The one thing it does need is a clear path between the victim's body and your destination. Clearly you can't have the patient bumping over rocks and sticks while being moved.

Pull the victim by his collar, hauling him in the direction you want. You can do a modified version of this technique, called the blanket roll, by gently maneuvering the patient onto a blanket and then dragging the blanket. See Figure 3.4.

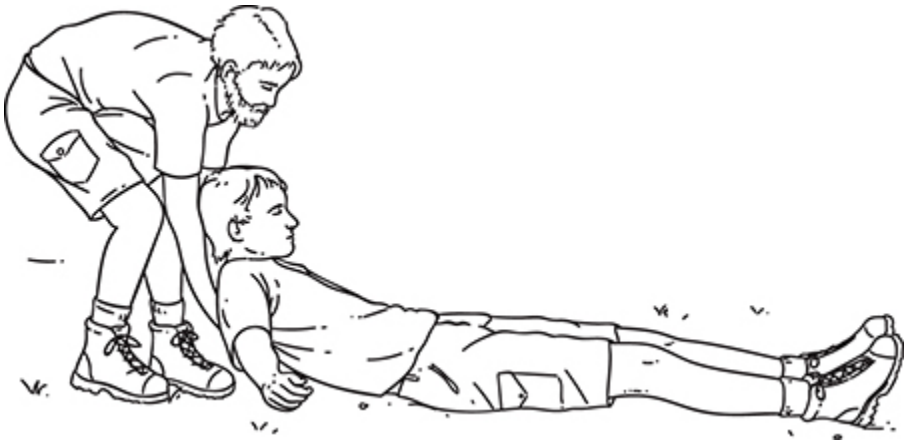

Figure 3.4. The clothes drag

One-Person Walk Assist

If the victim is alert and can move on her feet, put one of her arms behind your neck and hold her wrist. With your other hand around her waist, you can guide her to safety. See Figure 3.5.

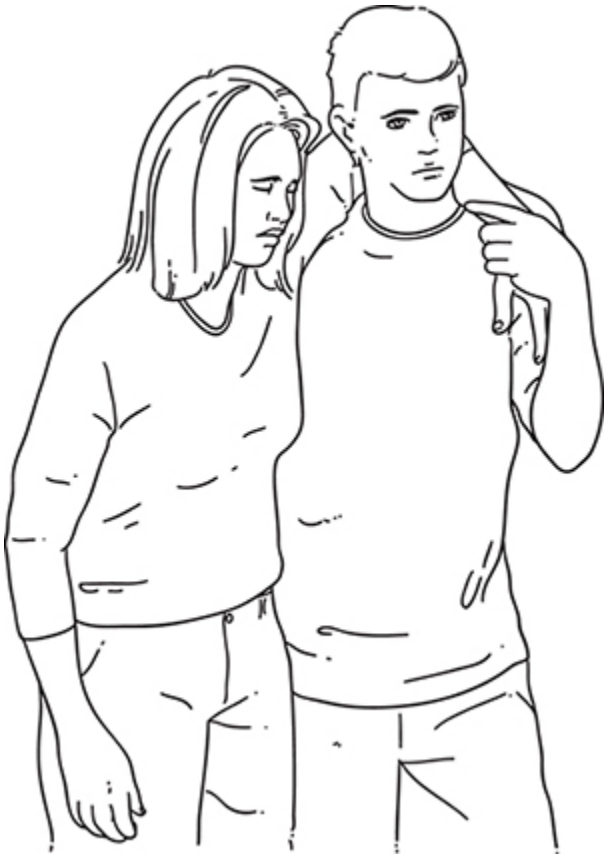

Figure 3.5. One-person walk assist

The Front Cradle

If the victim is small—especially if she is a child—use this technique to get her out. Keep in mind that it will wear you out quicker than some other techniques. The patient slips her arm around the back of the rescuer's neck while the rescuer lifts the patient under the lap, carrying her to the desired safe spot. See Figure 3.6.

Figure 3.6. The front cradle

HELICOPTER EVACUATION AND SIGNALING

In certain emergencies, rescuers may need to pull the victim out by helicopter. In such cases, it's your responsibility to let them know where you are. Find the highest point close to where you are, and kindle a fire. Put

on plenty of green stuff; that will both create white smoke and keep the fire under control. You can burn rubber and plastic if you want to create black smoke.

Take all the usual precautions when building and tending the fire. An out-of-control signal fire can do a lot of damage and could endanger your lives if it starts a forest fire.

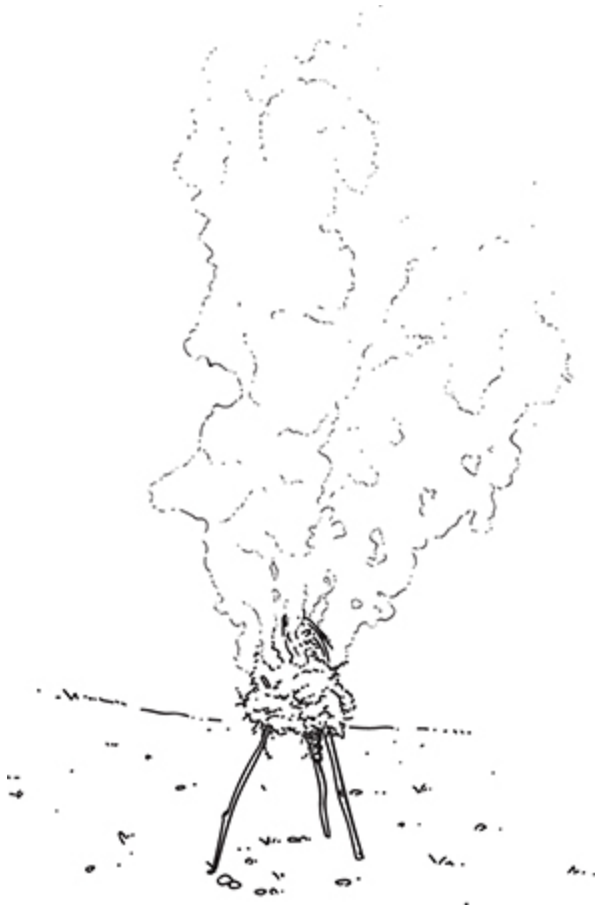

Figure 3.7. Signal fire

Lighting a signal fire is the same as any other fire—just think bigger. Have multiple sure-fire ignition points in the fire lay as well as all the fuel and signal-type additives, such as green branches or pine bows, standing by. The main thing to remember with signal fires is to create an updraft to raise the smoke plume—so oxygen at the base is imperative. You may also consider a smoke generator,

which is a fire shelf built on a tripod of sticks to allow maximum updraft for the fire.

First, construct a tripod with three green wood poles approximately 2" in diameter. Then add a shelf approximately one-third of the way up the legs. This will allow the oxygen to flow freely from the bottom and create a lot of smoke quickly. Once the fire lay is built on the shelf, the remaining upper frame can be stuffed with smoke-generating materials; have more standing by. See Figure 3.7.

Sometimes it’s possible to create a visual call for help—marking it out in stones, for example. If you can mark out an SOS followed by a vertical line, observers will know you have an emergency that includes a serious injury. If you spot someone searching for you (from a helicopter, for example), raise both your arms in the air. This is the internationally recognized call for help. If you lie on the ground with your arms over your head, you’re signaling that you or someone with you is injured. The hallmarks of signaling are contact and movement. For example, waving lit torches for circling aircraft or lighting three fires in a straight line will attract a lot of attention.

Don’t let the signal fire go out; you don’t know how long it’s going to take for someone to notice it. If you need to sleep, get wood or other burnable materials to keep it going.

BUSHCRAFT TIP

A helicopter needs an area approximately 100' × 100' to land safely. If you can find such an area near where you are, the pilot will be able to identify this cleared area from his craft.

CARING FOR UNRESPONSIVE INJURED OR ILL PEOPLE

If the unresponsive person is a member of your group, think about what you know about his or her medical history and ask other group members for any information they have. If you don't know him, ask his friends or anyone else at the scene if they know something about what happened. If you're alone or if no one saw what occurred, it's going to be up to you to figure it out.

- For your own safety and that of the patient and others, make sure that the area is clear of any dangers.
- Apply BSI (body substance isolation).
- See if the victim has any medical bracelets or medallions. Check his wallet for anything that might indicate a chronic medical problem.
- Perform an exam along the lines of what we discussed earlier. Check his vital signs, responsiveness, and ABCs. Look for signs of a seizure (irregular heartbeat, bitten tongue, spasming muscles). If the ground around him is disturbed, it may be because he thrashed about.
- First care for the ABCs and any specific injuries identified during the physical exam.
- If the patient has vomited, move him into a recovery position unless you suspect an injury to the neck or spine. If he has not vomited, continue to maintain his ABCs until you can move him into a recovery position.
- Maintain body core temperature by wrapping the injured person with a blanket and protecting him from the elements.
- Turn him to the other side, again in a recovery position, every two hours to inhibit blood from pooling internally, which may cause bruising.
- Evacuate him as soon as possible.

If you're going to take care of someone who's unresponsive and you anticipate that it may take several days before either rescuers reach you or he becomes

responsive, your priorities are shelter and warmth. This may require survival skills discussed in Chapter 2.

CARING FOR RESPONSIVE INJURED AND ILL PEOPLE

When a patient is alert and responsive, he will likely be capable of assisting in his own care, so ask him to help. For example, he can hold dressings in place while you bandage. Keep him engaged in his well-being and monitor for changes in vitals every fifteen minutes until EMS arrives.

Should the injured person only be responsive to verbal or painful stimuli, treat for shock by maintaining his core temperature, keep talking to him and giving psychological support (this encourages him to fight to be awake), and maintain ABCs. If he has vomited, move him into a recovery position unless injuries prevent such movement. Continue to monitor vitals every five minutes until EMS arrives.

TIPS AND TRICKS

- Heat up your water bottle and wrap it in a T-shirt to use as a heating pack for maintaining the core temperature of an ill or injured patient.
- Fill water bottles with cold water to use as cold packs for inflammation.
- Space blankets are reflective. Frames built for them can turn them into large signal mirrors to flash SOS.

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Chapter 4

TREATMENT OF BLEEDING AND WOUNDS

“So fragile—the human body. Just one prick and it will draw blood. Just one bullet and the bleeding never stops.”

—TIANA DALICHOV

Some of the most common outdoor injuries are cuts, scrapes, and puncture wounds. Often these are minor injuries but sometimes they are not. Even if a cut seems minor it can become infected if left untreated and lead to sepsis, a life-threatening illness.

STOP THE BLEEDING

The main goal in treating any bleeding injury is to stop the bleeding. To do this, apply direct pressure. Don’t place your bare hands directly on a cut or wound. Use gloves or another impermeable barrier to protect yourself. See Figure 4.1.

Figure 4.1. Direct pressure applied using a freezer bag

BUSHCRAFT TIP

It's quite possible that you won't have nitrile gloves with you. In that case, you need some nonabsorbent material to keep your skin and the blood apart. If you have any plastic bags (grocery, sandwich, etc.), those can do the job. So can a plastic trash bag or a Mylar blanket. If the injured party is known to you and you're reasonably sure he doesn't have a condition that could be transferred to you through blood, you can forego using gloves or a substitute.

DIRECT PRESSURE

If your patient has injured her arm or leg, raise the limb so it's above the heart. This will help slow the bleeding and make your job easier. Press down on the area and maintain that pressure for five to ten minutes. After ten minutes, if the patient is still bleeding, spread the pressure over a wider area and maintain it for another ten minutes.

If the patient has lost a lot of blood, she may go into shock, indicated by rapid breathing and pulse and possibly loss of consciousness. In these circumstances, you should keep her warm and, if she's awake, talk calmly to her to try to relieve her stress.

WOUND CLEANING AND BANDAGING

After you've stopped the bleeding, you will need to clean and protect the injured area. If the wound is very large or very deep, stop the bleeding but don't try to clean it. Seek medical attention immediately. When possible, allow the injured person to do the cleaning himself, as he will be able to adjust what he's doing to the amount of pain he's in.

Remove any obvious debris by brushing it away with a clean cloth or by using a pair of sterilized tweezers or a blunt-ended needle to pluck it out (in a pinch, heat tweezers/needle with a lighter to clean it; allow it to cool before using). If the material is deeply embedded, do not try to remove it but instead seek immediate medical help.

Once you have brushed away or otherwise removed obvious debris, flood the area with a large amount of clean water to flush away any remaining dirt or debris (see "Cleaning the Wound" later in this chapter for more information). Cool water will probably feel more comfortable than warm or hot water. Use soap to wash around the wounded area but don't try to dig into the wound itself (be careful when cleaning a wound near an eye so that soap does not get into the eye). The cleaning process may cause the wound to start bleeding again. If this happens, apply direct pressure to stop the bleeding.

Once the wound has been cleaned, protect it with a bandage and be sure to change the bandage at least once a day, or until professional medical help is obtained (then follow the medical professional's advice). When possible, use nonstick bandages and dressings so that removing them does not cause the wound to start bleeding again.

CLEANING THE WOUND

The best way to clean a wound is by irrigation—that is, running a forceful stream of water over it. A syringe is helpful for doing this, and if you have room in your pack, take along a 20 cc syringe. If you don't have one, cut a hole

in a plastic bag and use that. If the wound is deep, disinfect some water and hold it 6–8" above the patient, then pour it onto the injury. Be careful not to let any of the blood spatter on you.

BUSHCRAFT TIP

When cleaning wounds, be sure to use clean water. Bottled water is okay, although distilled is better. If using water from a natural source (such as a lake) be sure to boil it first, then let it cool, before using it to clean an injury. If the emergency is a serious one, use whatever water comes to hand, even if you don't have time to boil and cool it. You or a medical professional can deal with the issue of infection later.

USING DISINFECTANTS AND OINTMENTS

Cleaning a wound with soap and water is the best way to prevent infection. People often think using disinfectants such as rubbing alcohol, peroxide, or iodine can help clean the wound and speed up healing, but these chemicals are too harsh to use on damaged tissues and can actually slow down the healing process. You can use disinfectants on the skin around a wound to help keep it clean but don't use them on the wound itself.

If you don't have any commercial antibiotics for treating shallow cuts, use pine sap. You can easily gather it, and it will protect the wound from infection.

CLOSING THE WOUND

Make some butterfly bandages from a roll of Gorilla Tape. You can use them to hold the edges of the wound together. See Figure 4.2.

If you can't get a wound to close with tape or butterfly bandages, place sterile dressings in the wound to keep it clean and protected and then cover it with a bandage. Change the dressings and the bandage itself at least once a day, until you can obtain help from a medical professional. Closing a wound is a way to help the tissue repair itself and

to reduce the likelihood of infection but a wound doesn’t have to be sutured right away—sutures can still be placed by a medical professional several days after an injury has occurred.

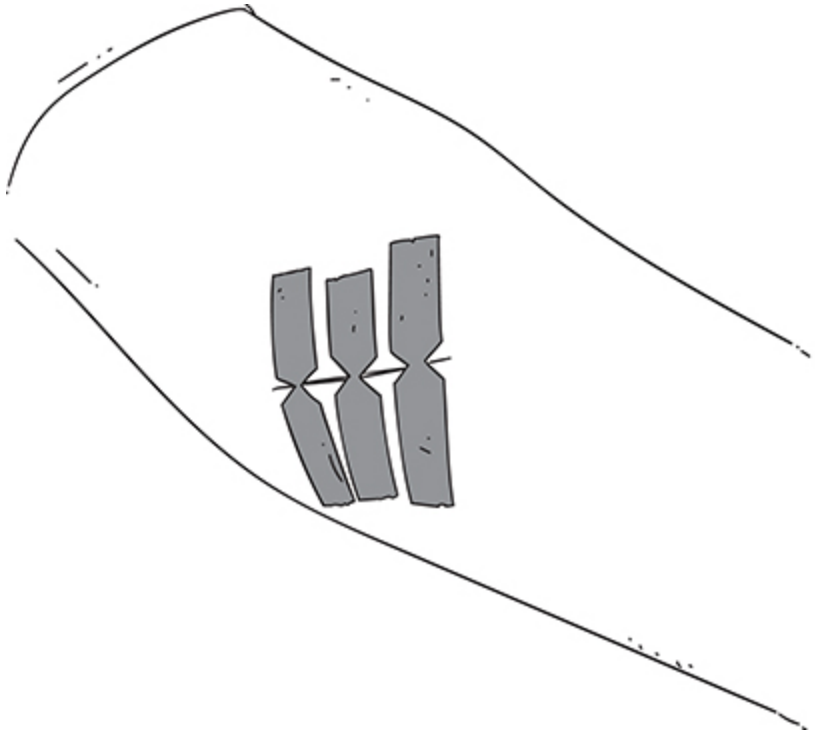

Figure 4.2. Butterfly bandages made from Gorilla Tape

LIMB FUNCTION

Sometimes a wound can injure tendons, ligaments, or even bones. For example, if someone in your party cuts his hand and can’t move his fingers, it’s probable that he severed a tendon. To determine how serious an injury is, you’ll need to evaluate limb function. If an injury to the arm or hand has occurred, first check for the ability to move the hand and/or fingers. If the injured person can move them, check them for grip strength, which should be firm but not tight. If your patient has injured his leg or foot, place a hand on the bottom of his foot and ask him to press down. Then make the opposite test: put your hand over his foot and have him try to pull it up. This will tell you whether the

blood is flowing as it should, how much strength there is in the limb, and whether the patient is experiencing pain in any kind of movement of his foot.

If a wound has injured a tendon, ligament, or bone, splint the affected limb to keep it immobile and protect the area. Although immediate professional medical care is desirable, tendon and other damage may be repaired even days after an injury.

CREATING AND APPLYING BANDAGES AND DRESSINGS

There’s a difference between a dressing and a bandage. A dressing is placed directly on the wound, while a bandage holds it in place. You can make an effective dressing out of a piece of clean cloth. Double it over and hold it with a piece of Gorilla Tape. See Figure 4.3.

Figure 4.3. Dressing with Gorilla Tape bandage

The main thing in applying a dressing is to be as clean as possible so as to avoid infection. To that end, wash your hands. If the cloth is sterile, that’s great, but if it’s not, you’re going to have to use it anyway. Find the clean part of it and use it. If time permits, boil it and let it dry before applying. Place the dressing material on the wound. If it’s a large wound, you may need to wrap the dressing around the wound. Maintain even tension to ensure that circulation is not cut off. Then secure the dressing by tying it, using tape, or with whatever improvised item you can find. For the wilderness first-aider, do what works!

As a wound scabs over and begins to heal, it will probably cause the dressing to stick a bit. Not only can this be painful when it’s time to change the dressing, but you need to be careful not to reopen the wound. You can get the

dressing off by wiping around the stuck area with a damp cloth. As in all things in this book, be gentle and mindful of your patient's discomfort.

BUSHCRAFT TIP

As far as bandages in the wild go, you've got a lot of options. You can use gauze, Gorilla Tape, or tear strips of cloth from a piece of clothing.

NO-PRESSURE BANDAGING

You may need to dress and bandage a wound that has an open fracture (the bone is sticking out) or with embedded debris that cannot be immediately removed (such as glass or gravel that is not on the surface). In these cases, you will need to apply a no-pressure bandage so as not to cause the injured person additional pain. Use your bandaging material for this. Twist the bandaging material to create a rope-like effect. Shape this into a circle and place the center of the circle over the area you're trying to protect. Then gently secure the material in place.

SIGNS OF INCORRECT BANDAGING

If you have applied a bandage correctly, the bleeding should be stopped (or slowed) and the wound protected. If you've applied the bandage too tightly, it can restrict circulation and cause tissue damage. If there is a blue tinge in the nail beds, a feeling of coldness, or an inability to move the hand or foot below the bandaged wound, it is a sign of a too-tight bandage. So is pale skin around the bandage, a tingling feeling or loss of sensation near the bandaged area, or pain around the bandaged area that isn't because of the wound. If any of these things occur, it's best to rebandage the wound.

PRACTICAL SCENARIO

Earlier today, you gashed yourself with a knife while preparing a nice, hot campfire meal. You cleaned and bandaged it, using a good amount of pressure because the wound kept wanting to bleed. Now your hand feels a little cold and it's tingling. It's too dark to tell if it has changed color. What should you do?

ANSWER

A cold sensation and tingling are signs you've bandaged your cut too tightly. If you could see it better, you'd probably notice your fingernail beds were turning a little blue and your skin had turned paler. Remove the bandage and try again.

USING TOURNIQUETS

A tourniquet is a bandage or other device that compresses a limb and its blood vessels in order to reduce blood flow. See Figure 4.4.

The use of a tourniquet is a last resort and in fact is rarely needed. Improper application of a tourniquet may cause permanent damage to the tissues of the affected limb, leading to dire consequences such as amputation. As we talked about earlier, you can use direct pressure, elevation of the limb, and pressure points to control external bleeding without the need of a tourniquet. However, sometimes you don't have a choice: if the patient is continuing to lose blood, you should use a tourniquet.

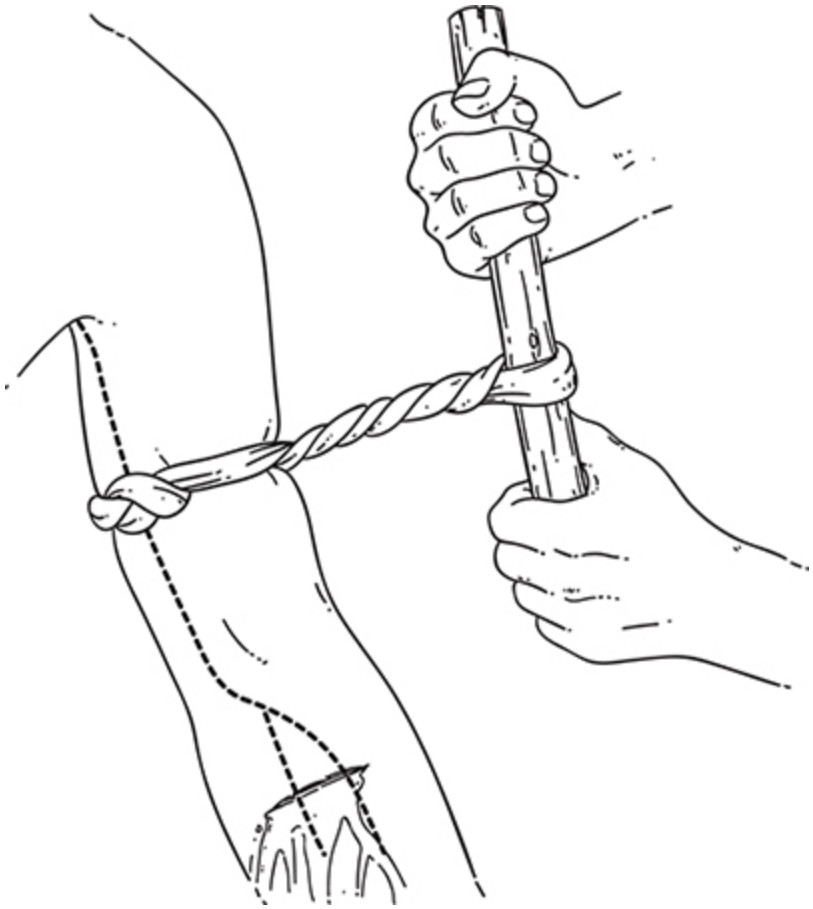

Figure 4.4. Example of a tourniquet

APPLYING A TOURNIQUET

Fashioning and applying a tourniquet isn’t difficult as long as you keep a clear head and follow these steps.

1. Placement of the tourniquet is important. You want to place it 2" above the injury. In case that puts you on a joint, go 2" above the joint. Wrap the area with the tourniquet material. If you aren’t using a professionally manufactured tourniquet, be careful with the one you’ve fashioned. The tourniquet should be approximately 2" wide and a few layers thick. Under no circumstances use rope or wire; they can further injure your patient. Belts aren’t generally flexible enough to tie tightly. It’s better

to use a strip of cloth, a pack strap, a plastic drum liner, or something else that can be rolled up and tied.

2. Start tightening the tourniquet. When you see the bleeding stop, stop tightening. Leave it on until it's taken off by a medical professional, since you don't want to loosen clots. These can get into the bloodstream and cause considerable damage.
3. If the patient is being evacuated and you're not going with him, pin a note to his clothing that will tell the doctor you've applied a tourniquet. It is best practice to place a TK (*TK* means "tourniquet") on the patient's forehead. Be sure to say when you put on the tourniquet.

PREVENTING AND IDENTIFYING INFECTION

Because of the way your body's infection-fighting white blood cells work, redness, heat, and tenderness in the area around an injury are the first signs that an infection is occurring. In the event of an infection, the lymphatic system kicks into high gear, carrying away unwanted stuff in your body. For this reason, red streaks may appear on the skin, pointing toward the heart. The patient's body temperature will increase—in other words, a fever—since some bacteria are negatively affected by heat.

An infection that starts to spread (indicated by the signs we just discussed) presents a serious danger to the patient. To treat it, you will want to draw bacteria from the wound in the form of pus. Soak a cloth in hot water and place it over the injury. If you don't have antibacterial medicine in your first-aid kit look for natural means to halt the infection. Find some tulip poplar leaves and put them in a bandanna, which you then put over the wound.

Any infection that lasts more than twelve hours is going to do sufficient damage to the patient that he'll require a hospital stay to fully recover. That being the case, your

priority should be making and executing plans for an evacuation. This is especially important because it's unlikely that a person with a fever and spreading infection can walk out on his own. At the same time, you want to keep everyone else in the group safe. If the patient's skin is covered with boils or other symptoms, keep the rest of the party away from him.

Hot soaks can cause the wound to reopen. That's not a cause for alarm, since it means the wound is draining pus and other harmful substances. Don't make the hot soaks too hot, but make them as hot as is tolerable.

Once the wound has drained, prepare a new dressing. Twice a day, reopen the wound, drain it, and re-dress it.

SPECIAL WOUNDS

Certain types of bleeding injuries require care beyond merely stopping the bleeding and cleaning and bandaging the wound. These special wounds require special care.

SUCKING CHEST WOUNDS

Sucking chest wounds are a special category of injury in which something has penetrated the chest wall. If the hole is a small one, the body itself will seal it (although this is still a serious injury). If the hole is too big for the body to self-repair, though, this is a sucking chest wound. A small wound such as one from a thorn can self-seal when the object is removed, essentially allowing the surrounding material to return to its proper position. In the event of a large penetrating object—such as impalement by an arrow or a broken-off tree limb—the hole is so large that when the victim breathes and her chest expands, she also sucks in air through the hole. If the injury isn't properly treated, this can collapse the lung.

It’s not sufficient to put a dressing and a bandage over the injury. This is a wound you have to treat in a special manner: you have to make a valve.

From some nonstick material—for example, a piece of plastic—cut a piece three to four times bigger than the hole. Using Gorilla Tape, seal three of the four sides of the bandage and leave one side open. This creates what’s called a flutter valve. An inhale will pull the bandage down against the hole and prevent air from entering it. An exhale will push the patch away from the hole temporarily.

FLAIL CHEST

Flail chest is a serious condition that results from multiple fractures of the rib cage caused by blunt force trauma; this is common in the wilderness due to falls from tree stands, ATV accidents, and stumbles while hiking. What’s happened here is that some of the ribs have been separated from the chest wall. When the victim breathes out, these ribs will push against the skin, creating a bulge, which will disappear when he breathes in. The patient will have trouble breathing and, because broken ribs are extremely painful, probably express great distress.

Place a folded blanket or some other soft padding over the area. Be very gentle while doing this; after all, you’re dealing with broken bones. This is a case where you should try to evacuate the patient swiftly so trained medical professionals can deal with the situation.

GUNSHOT WOUNDS

Since outdoorsmen are often hunters, accidental gunshot wounds sometimes occur. A single bullet can cause multiple internal and external injuries. Treatments are very limited in remote locations, but the following options will be useful for four types of GSWs (gunshot wounds).

SUPERFICIAL GSW

Treat superficial wounds as you would any other puncture wound. Apply pressure, dress the wound, and apply a pressure bandage. Keep in mind that a GSW may have caused damage in the tissue surrounding the actual entry point. Bullets rarely follow a straight line when they enter the body and the bullet may have ricocheted or bounced off a bone, creating fragments, so do a careful assessment of the injured person to be certain you understand the full extent of the injury.

GSW TO THE ARM OR LEG

Apply direct pressure and elevate the wound immediately followed by a pressure bandage. If it's still bleeding, apply pressure to a pressure point then after thirty minutes if nothing has slowed, apply a tourniquet. The upper thigh is the site of the femoral artery. If the GSW is in that part of the body, apply a tourniquet immediately. Think about shattered bone fragments and internal injuries: if the area swells rapidly, that's a sign of internal bleeding. If bones appear broken, you'll need to immobilize the limb once bleeding is controlled.

GSW TO THE ABDOMEN

Think about protecting the internal organs. Bullet damage to the hollow organs of the abdomen can lead to a number of harmful conditions including severe internal bleeding. If you discover protruding intestines, place a moist, sterile dressing on top of the wound (to protect the organs). If the intestines are damaged or torn open, immediate medical care is required. If the injured person does not bleed out first, he may likely die due to severe bacterial infection that will ensue. Make certain the injured person does not eat or drink anything until the pain lets up, then he should only sip clear fluids for a day or two after.

Rehydration via IV fluids will likely be required once the injured person is in a hospital setting.

GSW TO THE CHEST

Spinal injuries and sucking air into the chest are two major concerns with a GSW to the chest. If the wound is open, creating a sucking chest wound, treat it as such by applying an occlusive dressing so that a lung doesn't collapse. If you suspect spinal injury, do not move the injured person as fragmented bone or bullet particles could make the spinal condition and internal bleeding worsen. If the heart, lungs, or a major blood vessel is damaged, there's nothing you can do in a remote area without proper expert medical care.

BUSHCRAFT TIP

In nearly all cases you should not attempt to remove an implanted bullet while in the field. Most are nearly impossible to locate, and some may actually be aiding in the prevention of worsening bleeding once lodged.

KNIFE AND AXE INJURIES

Most knife and axe injuries in the wilderness are superficial and can easily be controlled with direct pressure, elevation, and proper dressing and bandaging without the need for sutures or ointments.

For more serious wounds such as stabbings and deep lacerations, stopping the blood loss is of immediate importance. You can best accomplish this by using clotting agents, tampons, scarves, shirts, or other sterile absorbents.

Many plants contain tannins. These are a drying as well as constricting agent, and they work well in masticated or powdered form to help stop bleeding. Depending on the type of wound you may use different types of plants as aid

if you have nothing else. Yarrow flower tops and leaves work well for deep gashes, and common goldenrod works well on superficial bleeding. Many plants are absorbent to some extent and can be used directly for bandages or as a medium between layers to absorb blood. Mullein has large, broad, soft leaves that will work as standalone gauze, while you can use things such as cattail fluff as a batting material to help soak up blood in between dressings. See Chapter 16 for more information on using plants to help heal injuries and illnesses sustained in the wild.

As a general rule, wounds that remain closed on their own do not require sutures; you can clean them and keep them closed with butterfly bandages or duct tape. Deeper wounds that remain open on their own, however, should not be sutured in the field due to the likelihood of bacterial infection and the possibility of them constantly opening back up. So keep those types of wounds clean and covered with dressings and bandages.

When medical help is less than an hour away, you can get away with a lot more in wound care. Wash it out with whatever clean water you have and slap a bandage on it, and you're pretty much good to go.

SELF-AID

What if you're at camp, all alone, a day away from any sort of help and you chop into your inner thigh and cut your femoral artery? You could likely bleed out in as little as two minutes if you don't act fast. If you are alone and ill prepared, you're in trouble. Even if you have someone there to assist, you could still bleed out if you don't act quickly.

The quickest solution is to apply a tourniquet to stop the bleeding. Then you need to clean the wound carefully. Wash it with clean water and soap.

After you clean your life-threatening wound, you need to somehow clot the blood. Celox is the best clotting agent currently available, but another option that is doable so long as you do not have a shellfish allergy is sterile powdered shellfish carapace (exoskeletons of crabs, lobster, shrimp), which is the base of many common clotting agents such as Celox. Or, use wood ash to pack the wound.

Once bleeding is controlled, lie down, elevate the injury, and try and relax. Await help and if possible, scoot yourself into a safer place to shelter until that help arrives.

TIPS AND TRICKS

- Use a credit card or driver’s license as a “dressing” to help stop bleeding and protect a wound.
- Sterilize cloth in the wilderness by boiling it and laying it out in direct sunlight to dry.
- You can create simple bandages using 1"-wide duct tape and a small square of cotton T-shirt.
- You can make a fomentation to treat local swelling from abrasions by soaking a piece of cotton material in an infusion of anti-inflammatory herbs such as plantain or jewelweed. See Chapter 16 for more on fomentations and infusions.
- Large mullein leaves make a fine emergency replacement for feminine pads if the need arises.

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Chapter 5

BLISTERS AND BURNS

“Pain is inevitable. Suffering is optional.”
—ORIGIN UNKNOWN

Blisters and burns are common injuries for those exploring the great outdoors. Often these are minor but sometimes they can be major; in any case they can take the fun out of the experience, so learning how to treat (and prevent!) them is crucial.

PREVENTING AND TREATING BLISTERS

At some time in our lives, practically all of us have experienced the pain and annoyance of blisters. Their cause is the rubbing of skin, which causes the outer layer to tear away from the secondary layer. In between the two layers, fluid accumulates, pushing the outer layer into a bulge.

BUSHCRAFT TIP

We have found that the best socks for long-term wilderness use are made of wool. Wool socks in all their variants such as alpaca, merino, and various blends not only have a natural ability to repel odor and water, but they keep most of their insulating

value even when wet. For avid hikers, we also recommend wearing sock liners such as polyblend compression socks, which aid in wicking away moisture while preventing the main sock from rubbing against the skin.

Obviously, the key to avoiding blisters on your feet is to reduce the friction on them. You can use one of these methods:

- Fit boots properly.
- Put padding in your boots that protect your feet from places they're likely to chafe.
- Wear two pairs of socks to reduce sliding.
- Tape your feet with moleskin or surgical tape. If you have any pre-existing sores on your feet, make sure they're covered and padded.
- Going downhill increases the tendency of your feet to slide around in their boots. Make sure that before you start down a slope, your boots are tightened.

SELF-AID

Whatever kind of boots you buy, the most important thing is that they fit properly. The longer you wear leather boots, the better they'll fit as the leather gradually assumes the shape of your feet. Plastic boots don't have this quality, so make sure when you buy them that they're an optimal fit. Above all, buy boots you feel comfortable in. Ill-fitting boots can make a simple walk in the woods a nightmare. In wet weather, coat your feet with petroleum jelly before putting on socks not only to soothe the effects of all-day wet feet but also to lessen the chances of blisters caused by the friction of wet socks.

Blisters on your hands can occur because of repetitive motions with tools, such as digging with a shovel or performing extended carving tasks with your knife.

To prevent blisters on your hands:

- If you feel a hot spot develop, address it by covering the affected area with duct tape, moleskin, or another type of dressing.
- Wear gloves that fit well when using tools, especially for repetitive-motion tasks.

- Working with tools often will help to build calluses on the hands, preventing hot spots. If you only use tools occasionally and all of a sudden have to do heavy work or work for an extended period, watch for hot spots and treat as discussed previously.
- Another thing that commonly causes blisters, especially from wood-handled tools, is the lacquer coating placed on many tools by the manufacturer; this coating causes friction and should be sanded to remove it. Then the handle should be oiled with a linseed oil to protect it.
- Excessive heat and cold can also cause blisters. Protect yourself from the elements appropriately. See Chapter 13 for more information on treating frostbite and sunburn.
- Contact dermatitis can cause blistering. See Chapter 15 for more information on preventing and treating plant-induced dermatitis.
- Bug bites can also cause blisters, so using an insect repellent can help. If a blister becomes itchy, apply a small amount of hydrocortisone to the affected area. See Chapter 14 for additional information on insect bites.
- Blisters can be a sign of chickenpox or shingles, so if you have additional symptoms, such as a fever or chills, seek medical advice. Also, blisters around the eyes and the genitals are a particular cause of concern and deserve medical attention.

BUSHCRAFT TIP

As with any wound, blisters can become infected, so watch out for signs of infection—warmth and redness around the affected area, red streaks leading from the affected area, greenish pus coming from the blister (instead of watery clear fluid). Seek medical help if you suspect an infection.

In treating blisters, take the following steps:

- Sterilize the blade of your knife, or a needle if you have one. You can use rubbing alcohol to do this.

- Pierce and drain the blister.
- Use decontaminated water to flush out the blister.
- Dry it and put a dressing and bandage on it.
- If the blister is large, don’t pierce it; instead make a doughnut dressing, place it around the blister, and secure it in place with a bandage.
- If necessary, use Super Glue or pine sap to close the wound.

FOOT ROT/TRENCH FOOT

Trench foot was a common problem faced by soldiers in World War I. Sometimes called foot rot or immersion foot, it is a tissue injury to your feet when they’ve been cold and wet for too long. If you have trench foot, your feet will feel numb at first—not too serious, you say. However, if you don’t address it at this early stage, and especially if you develop blisters on your feet, matters can get much worse; your feet can swell, you’ll lose sensation, and you’ll be in considerable pain. To prevent it, change your socks frequently and keep your feet clean, warm, and dry. Rub ashes from your fire on your feet. This is an effective prevention against trench foot, since it keeps your feet dry. See Figure 5.1.

Figure 5.1. Foot rot, also known as trench foot and immersion foot

SELF-AID

I (Jason) suffered from trench foot during one of the Pathfinder Scout classes. I observed good foot hygiene, changed socks often, and even changed boots, often cycling through three different pairs, rubber and hiker style. The class took place in rainy conditions with high humidity even when it was not raining. So when the sun was out, my feet would sweat, and when it rained, they just got wetter. Each night I'd warm them by the fire in the open air, but the condition really worsened when I got back home. The entire bottom of both feet became a blister, which had to be peeled off. After a couple of days of staying off my feet, I was able to walk around again, albeit in pain. When you think you have enough socks, bring more, especially if you're expecting inclement weather conditions.

BURNS IN THE WILD

A burn can range from a mild injury from touching a hot pan to a major trauma that occurs because your clothes catch on fire. Your immediate priority is to stop any burning that's still going on. If someone's clothes are on fire, roll

her on the ground to put out the flames or use cold water. In the event someone scalds herself, get the pieces of clothing covering the scald off as soon as possible; they're trapping the heat next to the burn and making it worse.

If burned clothing sticks to the skin, don't try to remove it but instead reduce the heat with cool water.

Next you need to cool the burn itself. If water is available, use that. Of course it's best to use clean water, but this is a time-dependent emergency; use the cleanest water available. If you're not near a water source, use cool soil, wet leaves or moss, or other natural means to cool the wound. Before you place these on the wound, cover it with plastic.

If the burn is severe (10 percent of the body or more), don't try to cool the burn using water as this could lead to hypothermia. Instead, focus on dressing the burn and getting immediate help.

MOIST VERSUS DRY DRESSINGS

Generally speaking, burn protocol requires the application of dry dressings to be placed on burns. This is due to the fact that moist (wet) dressings can sap heat away from the body, putting the burned person at risk for hypothermia. Moist dressings, however, typically make the patient feel better and also reduce the need for pain medications. So, here are some guidelines:

- When treating superficial burns (first degree), leave them dry. These burns require the least intervention unless they are in a painful area such as the face, neck, or other sensitive area.
- In partial-thickness or full-thickness burn cases (second and third degree), you may apply moist dressings to soothe and manage pain so long as they are not applied to more than 10 percent of the body. Your arm is about 9

percent of the surface area of your body, so keep that in mind as a handy reference. Anything more than this covered with a moist dressing could certainly lead to hypothermia because of the body's inability to regulate temperature.

APPLYING A MOIST DRESSING

To apply a moist dressing:

1. Clean the burned area as with any wound.
2. Dampen (do not soak) clean cloth dressings such as a bandanna, T-shirt, or gauze if you have them.
3. Apply the moist material to the affected area, making certain that the burn area is less than 10 percent of total body surface area; otherwise hypothermia may result.
4. Keep the dressing damp by using a secondary wet dressing to transfer moisture to the one on the burn; do not pour water onto the dressing.
5. Treat for shock by keeping the patient talking and maintaining core body temperature.

Try to relieve as much pain as a possible through proper wound care (appropriate burn dressing) and by keeping the injured person calm. You can offer ibuprofen or similar pain relievers. Certain plants can also help provide relief from pain—see Chapter 16 for more information.

Burns, especially severe ones, cause your body to lose fluid. To deal with this, administer electrolytes, although only at half strength. Don't let the injured person become dehydrated.

BURN CLASSIFICATION

Assessing the seriousness of a burn helps you determine how to treat it and whether you need to seek medical attention immediately.

- If the victim has been superficially burned, the skin in the area affected will be red. Press the center of the burned area; when you release the pressure, the skin will turn from white back to red again. While this kind of burn is certainly painful, it won't require a dressing. (Think of the last time you had a light sunburn to get an idea of what this kind of burn looks like.) Cool off the affected area with water or a cold compress such as a water-filled canteen until pain is alleviated.
- More severe burns, called partial-thickness burns, have penetrated several layers of skin. If you've experienced a severe sunburn in which your skin not only turned red but blistered, you've had a partial-thickness burn. Partial-thickness burns may be dressed with a dry dressing. More severe burns, such as those caused by fire, can be dressed with a moist dressing. (Remember not to use moist dressings on burns that cover 10 percent or more of the body.)
- The most severe burns are called full-thickness burns. Here the injury has penetrated all layers of the skin. Oddly, some areas of the burn may hurt less than more superficial burns. That's because nerve endings have been damaged. On the other hand, the area around the burn is likely to hurt quite a bit. A moist dressing will aid in reducing pain and will soothe the area more than a dry dressing. If immediate evacuation is not possible, a moist dressing is the best course of action so long as the affected area is no greater than 10 percent of the total body surface area.

WHEN TO SEEK MEDICAL HELP FOR BURNS

If the victim has been burned over more than 5 percent of his body, your immediate plan, after treating and dressing the wound, should be evacuation. This is due to the fact that treatment in remote locations for burns is

severely limited. The skin is our strongest defense against various forms of infection, and once it's burned away, we're at a much greater risk of contracting an infection. If the patient is burned over 20 percent or more of his body, he should be evacuated. Full-thickness-burn patients should always be evacuated as quickly as possible. If the victim is showing other symptoms (e.g., shivering uncontrollably, delusions, vomiting), he should be evacuated as soon as possible, since there may well be other injuries caused by the burn.

PRACTICAL SCENARIO

While canoe camping in the Boundary Waters of Minnesota, one of your friends has a bit too many to drink at camp around the fire. He begins to get animated telling a story and trips, then falls headfirst into the fire. You and your other three buddies scramble to pull him out. Then what would you do?

ANSWER

This scenario is sadly quite common, and the injuries sustained are not always limited to burns. They may include blunt force trauma to the abdomen and head and even injuries to the face such as broken teeth.

The first course of action is to stop any burning. Put out any fire on the victim's clothing or hair. Then make certain the injured person's airway is not compromised by severe burns, blood, or swelling. Burns will be determined by how long he was in the fire and what he fell on or if he braced his fall.

If he fell in and rolled out as you pulled him—not staying in contact with the fire for very long—it is likely that he only suffered superficial burns. But if he was excessively drunk and everyone else moved at the pace of a stunned drunkard, too, he may have lain in the fire for a few moments and perhaps braced his fall with his hands, attempting to push himself up on the hot coals. In this case, more severe partial-thickness burns along with superficial burns would be expected along with burning or at least melted outer garments.

Cooling burned areas is next on the list, as this will not only alleviate his pain but also bring down swelling. Do this while another person in your group is preparing burn dressings. It's at this time you'll be able to get an idea of the severity of the burns and if immediate evacuation will be required. Once you get a handle on the severity of the burns, you can begin to dress them appropriately and if available, administer some basic pain medication such as ibuprofen or apply any available burn gels. If there is cell reception, a call to the ranger station or 911 is also a good idea; they will advise on possible evacuation details. More likely than not, you'll be paddling out to a certain point, and unless you're a navigation wiz, it's not a good idea to take this on in the middle of the night while partially inebriated. You'll reassess your patient every five to fifteen minutes depending on burn severity and await daylight to assist in evacuation to proper medical care.

TIPS AND TRICKS

- For major pain relief in the field, consider giving (or taking) 1,000 mg of acetaminophen with 800 mg of ibuprofen; it provides the equivalent relief of some popular narcotic medications. Do not take more than three times in one day and do not take over an extended period.
- Wool does not burn as readily as cotton or synthetic material, so it’s an excellent choice for outer garments such as shirts and jackets.
- The slime contained in the shoots of cattail is akin to aloe vera; it works as a topical anesthetic as well as an anti-inflammatory and is great for minor burns, including sunburn.
- Reducing anxiety can aid in reducing pain, stress, and the severity of injuries by relieving muscle spasms.

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Chapter 6

BONE AND JOINT INJURIES

“The success of Egyptian surgery in setting broken bones is very fully demonstrated in the large number of well-joined fractures found in the ancient skeletons.”

—JAMES HENRY BREASTED

Bone and joint injuries are the most common types of injuries in the outdoors—and people have been successfully treating them for thousands of years. The majority of outdoor injuries occur as the result of a stumble or fall but bone and joint injuries can also occur through repetitive use (a stress fracture after an unusually long trek, for example) or improper physical conditioning before undertaking strenuous tasks. Such injuries are fairly common among weekend warriors—people who have desk jobs and sedentary lifestyles throughout the week and who then overexert themselves during a weekend camping trip. Remember, if you haven’t been on a hiking trip for ten years, you should build up to your grand adventure of hiking the Appalachian Trail from Maine to Georgia.

TREATING FRACTURES

Broken bones come in all shapes and sizes. The most serious kind of break is a fracture, in which the bone has been broken to the extent that the ends of the break have separated. There are two kinds of fractures: open and closed.

- **Open fracture.** The broken end of the bone has penetrated the skin from the inside and pushed through it.
- **Closed fracture.** The broken ends of the bone have separated but are still beneath the skin. In such a fracture, you may notice a bulge where one of the broken ends is pushing up against the skin but hasn't penetrated it. This is called tenting.

Both kinds of fractures are extremely serious, and if there is an open wound near a fracture, it offers an opportunity for bacteria to infect the body.

SELF-AID

Fractures are hard enough to treat if other people have them, doubly so if the victim is you. You're in a lot of pain, but the most important thing is to be calm so you can evaluate your injury. Address bleeding first as it will be difficult to treat the break if it is still bleeding freely. See Chapter 4 for more information on how to stop bleeding.

Once bleeding is addressed, examine the fracture itself. If it's closed with no bone end protruding through the skin, you may slowly reduce any misalignment of the bone by moving it back into a normal body position. Some breaks, such as an open fracture, may be too bad to allow this. When the bone ends come through the skin, leave it alone and clean and cover the exposed bone. Careful examination is required to have a fair understanding of what's possible.

We'll assume it's a simple closed fracture, so your objective is not to set the bone back into place, but to move it back into a normal, resting position. For example, if your forearm is bent at a 90° angle, cradling the arm and moving it back to a flatter position will ease discomfort and make splinting a little more manageable.

Once you've examined the fracture and if needed, reduced it, splint and immobilize the injured area. Again, in the case of a fractured forearm, you might use a folded emergency blanket to cradle under the arm to provide padding for a splint while you then place a stiff stick alongside it to be taped. This will immobilize the fracture, preventing unwanted motion to and fro. Then by tying a couple of bandannas together, you create a cravat or sling that will cradle your elbow and keep your arm close to your

chest, again in an effort to minimize motion of the injured limb and protect it from unnecessary bumps during evacuation.

TREATING THE WOUND

As we said earlier, a wound near a fracture is a serious issue, and you should address it first. Do what's necessary to slow and stop the bleeding (pressure points, dressing, and bandage). Pressure here is tricky because of the fracture; rather than use direct pressure, employ pressure points, those pulse points between the injury and the heart that can be pressed to control bleeding.

Once you've controlled and halted the bleeding (or if the wound isn't bleeding much in the first place), clean the area with disinfected water and put a dressing and bandage on it. At this point you can address the fracture itself. Gently put a splint on it, being sensitive to the patient's pain. In some closed fractures, there will be no exterior open wound at all, so just take care not to aggravate any bruising as you treat the fracture.

PRESSURE POINTS

A pressure point is a place on the body where an artery can be pressed against a bone to slow bleeding. The quickest way to locate a pressure point is at the pulse point between the wound and the heart. Palpate (feel with the fingers) along a limb until you find a strong pulse and apply pressure at that point to reduce bleeding. Some of these points are found in the neck (carotid), at the end of the wrist, in the bend of the elbows, under the arm, and at the top of the thigh in the groin.

SPLINTING THE FRACTURE

A splint immobilizes the injured bone to keep it from further damage and to reduce pain. So anything you find

that will get the job done is fine, so long as it does not pose any risk of further injury.

Treatment should not further injure the fractured area; protect open fractures and keep closed fractures closed. By definition, an open fracture creates a wound that can lead to infection all the way down to the bone marrow. Therefore, it's vitally important to keep open fractures clean, covered, and protected until you reach definitive medical care. Keep a closed fracture from becoming an open one by properly splinting and immobilizing the injury site. It would be a terrible thing for a broken bone to cut its way through tented skin during evacuation along a rough trail.

When you're splinting a fracture, it's very important to take bleeding into consideration, particularly the arteries, since a severed artery can cause the patient to bleed out. To guard against this, make padding and pack it around the splint wherever it seems loose.

Since the injured person should be evacuated as soon as possible, you'll be faced with the problem of moving him while creating as little movement as you can of the injured limb. The weather can present challenges; if you used metal for the splint, it will adjust its temperature to outside air, so if it's very cold, you'll need to wrap the splint in something to insulate it.

You can fashion a splint using the following pack items:

- Cargo tape
- Cordage
- Cutting tool
- Emergency blanket (this can also be fashioned into a sling)

For the splint itself, a sturdy branch or bough stripped of leaves and twigs will work splendidly.

Whatever natural material you use, do your best to keep dirt away from the wound itself and maintain a clean dressing. See Figures 6.1, 6.2, 6.3, and 6.4.

Figure 6.1. Leg splint (notice the padding around the joint)

After splinting the fracture, elevate the injured limb if possible to reduce swelling.

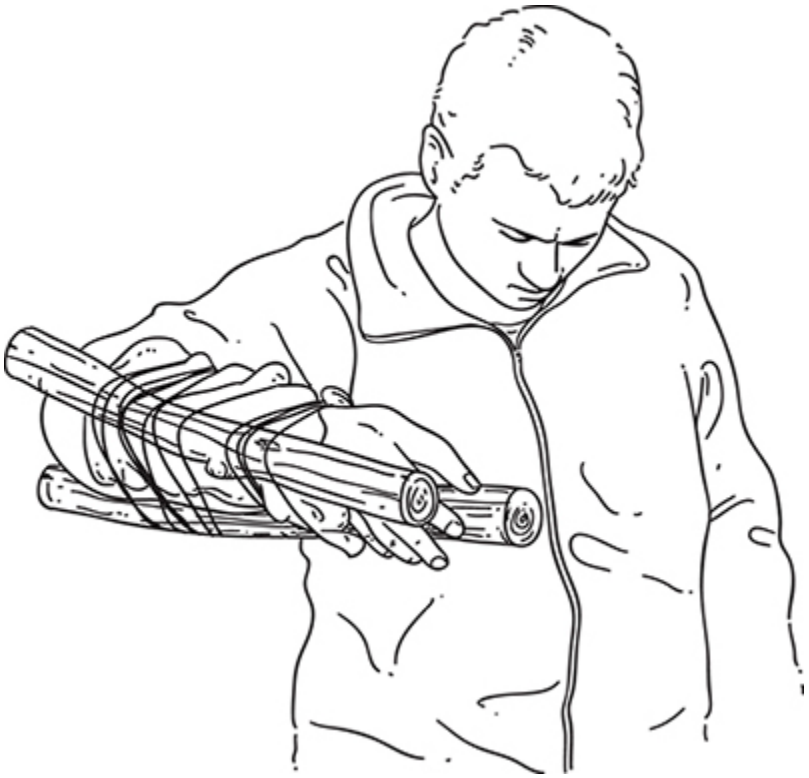

Figure 6.2. Arm splint, heavily padded and cord wrapped

Figure 6.3. Backpack used to immobilize fractured arm

Figure 6.4. Splinted arm, secured with cordage, padded with a diaper

When treating a fractured limb, the injured person can assist you in wrapping, padding, and holding the limb to keep it from jostling around.

If the victim has injured her leg and is lying down, you can use a small-diameter stick to snake up a pant leg. Once upward pressure is applied to the stick, it serves as a crane. The pants serve as a cradle for the limb as you move it into position.

Another method is as follows: use both your hands to hold the joints and gently pull them apart. This will prevent the break from sagging while you splint it.

TRACTION SPLINTS

To treat fractured femurs (thigh bones), you'll need to make a traction splint. A traction splint, ideally, is a manufactured apparatus that will secure the upper and lower leg with a tension device at the foot. Wraps are

placed around the ankle of the injured leg and then a screw is turned to provide tension on the wraps on the distal (lower) portion of the leg allowing it to lightly separate from the upper half, thereby reducing pain and the potential for the broken bone to rub against the other or cause injury to the femoral artery.

BUSHCRAFT TIP

Any thigh injury, including a fracture of the femur, is serious, since your thigh is the site of the femoral artery. Damage to this blood vessel can be fatal, because it will release a large amount of blood (if nothing else, this will probably cause the patient to go into shock).

It’s very unlikely that you carried in a traction device. Fortunately they’re easy to make, especially if you have ski poles or a walking stick. Splint the outside leg its entire length, going up to the armpit. Splint the inside leg to the groin. Now wrap the leg (which helps to hold the splints in place) and create a wrap for the ankle. Attach a cross stick to the bottom of the splints and attach one end of the ankle wrap. Use a twisting stick to increase tension on the bottom of the splint. See Figure 6.5.

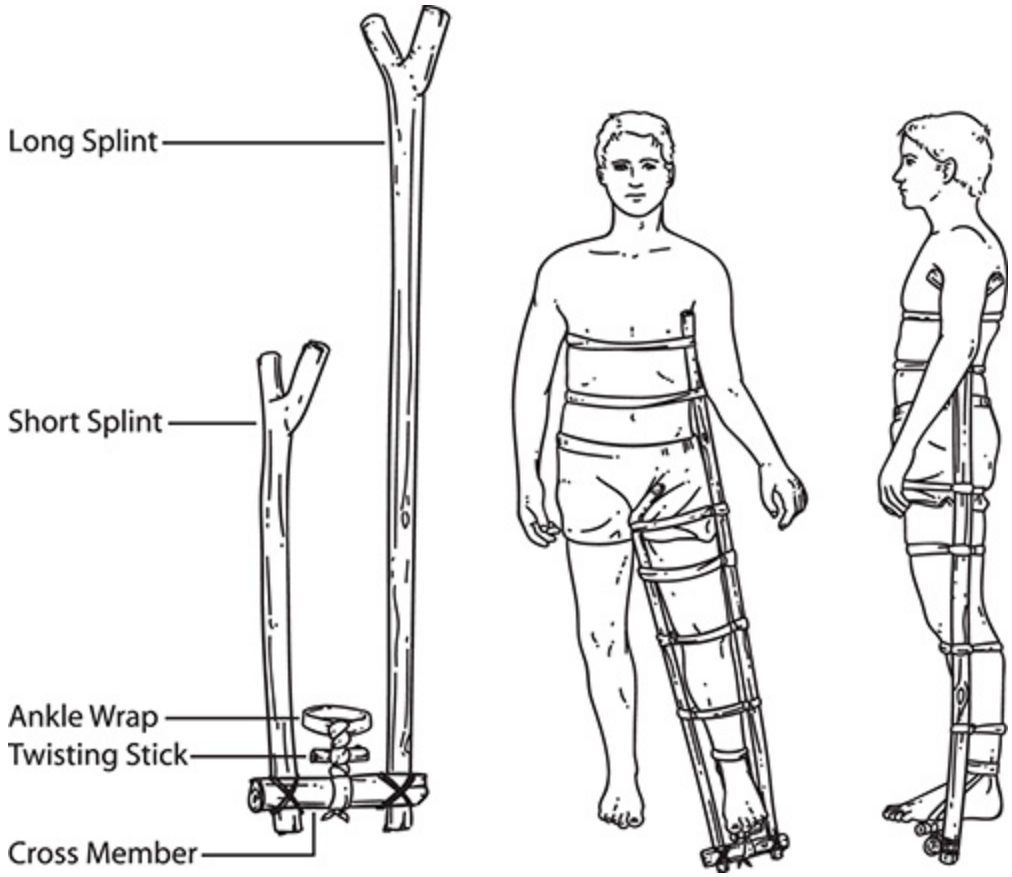

Figure 6.5. Traction splint from wooden material

TREATING DISLOCATIONS

A dislocation is an injury to a joint that causes the bones of the joint to spread apart. You can see a dislocation because the joint will look wrong. The affected person will not be able to move the joint (or movement will be difficult and extremely painful). Any joint can become dislocated as a result of an injury.

Treat a dislocation much as you would a fracture. Stop bleeding, clean and dress the wounds, and splint the limb. If the dislocation has happened to a finger, kneecap, or shoulder, you can try to put the bone back in place. If the dislocation has happened to the hip, ankle, or elbow, get a professional medical person to treat it. Trying to force these joints to reduce may cause further injury.

SELF-AID

Self-reduction in the case of a dislocated joint is entirely possible, and the joint may go back into place with any attempted movement. You treat a dislocation as you would a closed fracture: control bleeding, splint the injury, and immobilize the area.

While pain will be relieved by reduction, there will still be residual soreness and stiffness, so acetaminophen or ibuprofen, if available, are acceptable for pain relief. A tea of willow bark would also be helpful as willow contains salicin, a naturally occurring aspirin. Just be certain you can properly identify the tree and understand how to use it correctly and only do so if you're without an allergy to aspirin.

CARING FOR SPRAINS, STRAINS, AND CRAMPS

Damage to the tissues of a joint caused by stretching or twisting results in a *sprain*. Such stretching or twisting often occurs when you fall or if you slip or make a misstep. The damage to the tissue causes swelling, which inhibits movement. Pain is another common symptom. Keep the RICE procedure in mind:

- **R**est
- **I**ce
- **C**ompression
- **E**levation

Always give support to the injured limb by splinting or taping it.

Strains are pulled or torn muscles. Any type of unusual motion, like a fall or a sudden action, can cause the muscle to twist or move beyond its typical range, resulting in damage to the muscle fibers. To treat, apply the RICE procedure, and stretch gently.

BUSHCRAFT TIP

Rest, compression, and elevation are fairly simple procedures, but ice is typically not available in the wilderness three seasons of the year. You can substitute a water bottle filled with cool water to be used as a cold pack or wrap strips of wet cotton loosely around the injured area and allow evaporation to cool the injury site.

Muscle cramps are unintended contractions in the muscle (that is, you're not deliberately using the muscle to perform a certain function). They occur because of some type of stress on the muscle. This stress could include holding it in one position for a long time or it could be the result of a muscle strain. Dehydration can also cause muscle cramps.

Stretching the cramping muscle can often make it feel better. You can also apply pressure to the area. Ice, if available, can often calm down a cramping muscle. For cramping caused by dehydration, give plenty of water.

ANKLE INJURIES

Ankle injuries are common in the outdoors. Ankle sprains can range from mild to severe in nature. Symptoms are sudden pain, swelling, bruising, and an inability to walk. If the sprain is mild, you may only experience some tenderness when touching it and may not have any, or very little, swelling. On the other hand, in severe cases, the swelling may be substantial and the pain intolerable; putting weight on the foot may be next to impossible.

Similarly to ankle sprains, ankle fractures are a common type of injury. However, unlike ankle sprains, a broken ankle always requires medical attention. With the symptoms so similar, how can you tell a broken or sprained ankle apart? Well, there are a few distinguishing signs to keep in mind.

First, ask the person to try to recall if there was a sound when she was injured. A "cracking" noise may be a sign

that the ankle is broken while sprains are often associated with a “popping” sound. Second, check if the ankle, in addition to being swollen, appears deformed or crooked as this may be a sign of a fracture. Third, the presence of numbness is indicative of a fracture. Moreover, if the person cannot move the ankle joint at all, is in extreme pain, and cannot put any weight at all on the ankle, it is likely that it is broken.

PRACTICAL SCENARIO

Let’s say you’re hiking along the Appalachian Trail and you come across a fellow hiker who is sitting and rubbing at his ankle in obvious distress. How can you help this person? How can you tell if the injury is just a sprain or a more serious matter, such as a fracture?

ANSWER

As you approach, announcing yourself and how you’re trained in first aid, you do a quick scene survey to determine the MOI (mechanism of injury). Once you determine the scene is safe, you ask what happened. The hiker replies, “I tripped over a root and fell, but my foot was caught under the root and it popped as I hit the ground. It really hurts.” You ask if there is pain anywhere else and as you look at him you see no obvious blood or other injuries. He replies that the ankle is all that hurts. So, you begin to asses the injured limb.

This patient reports a “popping” sound and you can see the ankle is severely swollen. So you would adhere to the RICE protocol in an effort to reduce localized pain and swelling. After he has calmed down and gotten a handle on the pain, you must consider evacuation, depending on how far you are from a roadway or town. This may dictate how you proceed. For this case, you decide to walk to the nearest shelter with the injured person because the shelter is near and the terrain is not rough. From there you will be able to get further help. You pull out your extra boots and reinforce your compression wrap with a tightly tied boot on the injured person’s foot and offer him some over-the-counter pain medicine; then, you begin your journey to the shelter where you will re-evaluate the injury and rescue plan.

TIPS AND TRICKS

- Should you suffer from a broken bone, avoid carbonated soft drinks as their phosphorus content can weaken the healing process. Also avoid caffeine, which binds to

important calcium molecules, preventing bones from absorbing what they need.

- Think about the boots you wear when traveling in the woods. In a hunting scenario, it is best to wear neoprene and rubber-type pull-on boots. These can easily be pulled on and off with only one hand and fit better over a swollen ankle if necessary.
- A strip of T-shirt cut from around the bottom into a strip about 6" wide makes a great emergency elastic bandage (like an Ace bandage).
- Practice skills such as fire building with your nondominant hand. Most of us will catch our fall with the dominant hand, and injuries occur most commonly during a fall or trip. Knowing how to use your other hand for essential tasks can keep an injury from turning into a disaster.

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Chapter 7

CIRCULATORY ISSUES

"All truly great thoughts are conceived while walking."

—FRIEDRICH NIETZSCHE

Circulatory issues are those that relate to the heart, blood, and blood vessels. Sometimes they can be related to an illness, either chronic (such as peripheral artery disease) or acute (such as a heart attack), or they may result from another injury (as in the case of shock). For managing chronic illnesses while still enjoying the great outdoors, see Chapter 12.

IDENTIFYING AND TREATING SHOCK

Circulatory shock (sometimes called hypoperfusion or just "shock") results when an inadequate amount of blood is getting to tissue. It can be caused by loss of blood or anything else that creates dangerously low blood pressure. Our organs depend on blood to carry nutrients, oxygen, and other materials to them; when they don't get enough blood, they stop functioning. Although there are a number of

different kinds of shock, in wilderness first aid we are primarily concerned with a few of the most common types. If left untreated, shock can lead to death.

TYPES OF SHOCK

Hypovolemic shock refers to a condition in which the amount of blood in the victim's body has decreased past a dangerous point. It can be caused by excessive bleeding, particularly from a severed artery. (This kind of shock is also called *hemorrhagic* shock.) Treatment is to stop the bleeding and dress and bandage the wound.

You can also experience hypovolemic shock if your body is dehydrated and the body starts sending water instead of blood. It can also be the result of severe burns (remember, we said earlier that one symptom of a severe burn can be dehydration). In both cases, increasing fluid consumption can help prevent the problem. Look for: rapid, weak pulse; low blood pressure; change in mental status; cool, clammy skin; and an increased respiratory rate. If the patient displays these, she may be in shock.

SELF-AID

The best way to avoid any health problems in the wild is to anticipate them and prevent them before they occur. Proper hydration in the field is an example. A typical 200-pound male needs approximately 64 ounces of water per day to maintain proper body function. If we add levels of exertion and stress, or extreme hot weather, this number increases. Most people today do not drink enough water on a daily basis, and we generally enter the field in a dehydrated state.

Cardiovascular exercise should be an important part of daily life. If we intend to be active in the outdoors it is not enough to only worry about exercising our circulatory system on the weekends. Simple things like taking the stairs instead of the elevator or parking farther away from the store in the parking lot will help. If you are a daily walker, it will help you to walk with a loaded pack of similar weight to what you would carry into the woods.

If you're confronted with a person suffering from hypovolemic shock, the first step is to stop the bleeding.

Then check her airway to make sure it’s clear. Elevate her legs 6–12" and keep her warm—and evacuate her promptly.

If the victim has suffered a cervical spine injury, this can disrupt or sever the signals the brain is constantly sending to the heart and blood vessels. As a result, the heart slows and arteries swell. This is *neurogenic* shock. Look for bradycardia (slow pulse), low blood pressure, and neck or back injury. Check for a clear airway, immobilize the spine, and assist with rescue breathing as required. Evacuate the victim as soon as possible. To help prevent this type of shock, if you find signs and symptoms of a spinal injury, immobilize the patient’s head by placing a blanket under his neck, then rolling it up to his ears on each side. You should also use a blanket to keep him warm and to restrain his body movement, which could make the injury worse.

If the patient has suffered a heart attack, she may go into *cardiogenic* shock. This makes the heart pump less efficiently, thereby reducing circulation. Signs and symptoms include chest pains; an irregular, weak pulse; anxiety; and cyanosis (bluish color under nails and in lips). There’s not much you can do to treat this; the patient should be evacuated for professional medical care as soon as possible. Place the victim in a comfortable state such as seated with hands on knees to relieve chest pressure (tripod position); help her in taking her prescribed medication for the condition. You may also have to help with breathing, which may include rescue breaths.

Anaphylactic shock refers to shock brought on by an extreme allergic reaction. This kind of shock cuts off or constricts airways and dilates arteries. The result is the lungs take in less air, which can lead to mild itching, rash, burning skin, vascular dilation, profound coma, and rapid death. Standard treatment is the administration of epinephrine and the management of the airway. Anyone who suffers from a chronic allergy probably carries an

EpiPen with her; ask where it is, and if she can't tell you, search her pack for it.

If an infection has spread throughout your body, it will probably damage the circulatory system to such an extent that blood circulation will drop. This can send you into *septic* shock. Signs and symptoms include warm skin, tachycardia (rapid pulse), and low blood pressure. The patient suffering from this should be evacuated quickly. While waiting, keep him warm and elevate his feet. This is a good reason to keep close track of any infections and treat them from the beginning.

BUSHCRAFT TIP

Shock can complicate an already delicate situation. If the injury is serious and the patient has lost a lot of blood, anticipate shock. Finish treating other injuries and then assume the patient will go into shock and treat for it.

FOUR STEPS FOR TREATING SHOCK

Here are four things to do for shock:

1. Check the victim's airway and remove any blockages.
2. Perform rescue breathing by giving two normal breaths via mouth to mouth roughly two seconds apart. Aid as needed until the patient's breathing is normal, twelve to twenty breaths per minute.
3. Keep the patient warm by removing any wet clothing and wrapping an emergency blanket, sleeping bags, and hot packs around the patient as needed. In wet conditions erect a shelter to protect the patient, and build a fire if necessary.
4. Keep the person talking. If she passes out, just keep talking to give her something to hold on to, which may aid in her forcing herself back awake.

RECOGNIZING AND TREATING INTERNAL BLEEDING

Unlike external bleeding, which you can see happening, internal bleeding can be easy to overlook—meaning an injured person can potentially lose a lot of blood and go into shock before anyone recognizes the danger.

While internal bleeding can be the result of a number of different problems, such as stomach ulcers, a ruptured ovarian cyst, or an aneurysm (weakened blood vessel), in the wilderness it is more likely to be caused by trauma, such as an ATV accident or a bad fall. Think of dropping a heavy weight on your foot. It might not break the skin but it certainly leaves a bruise! Any type of blunt force like that can create internal bleeding. A fracture can cause damage to the surrounding blood vessels as well, so even if the fracture is closed (doesn't break the skin), internal bleeding may be an issue.

If a person is taking certain types of medications, such as those that thin the blood (warfarin, heparin, even aspirin), or has a medical condition that interferes with blood clotting (hemophilia, liver damage) internal bleeding is more likely and harder to control.

Bruising, swelling, pain, weakness, and dizziness are potential signs of internal bleeding, especially if they occur after an injury or accident. Tenderness, rigidity, and swelling in the abdomen are particularly troubling signs. So too is vomiting or coughing up blood. Over the longer term, black or bloody stools are also a sign of internal bleeding.

If you suspect a person is bleeding internally, check ABCs and repeat them every five minutes. If the person is responsive, raise the legs 8–12" to prevent blood from pooling in the legs and feet, then treat for shock (see "Four Steps for Treating Shock" in this chapter). If the person is unresponsive, place him in the recovery position (see Chapter 3) and treat for shock. Rotate the person to the other side (in the recovery position) every two hours until

definitive medical care is available (this will help prevent blood from pooling in one location). In any case when you suspect internal bleeding, arrange for immediate evacuation.

PRACTICAL SCENARIO

While snowshoeing, you find a woman lying across a well-traveled trail with her dog on a leash next to her. As you approach, you don't see any blood on the snow. Her dog leaps about to greet you in a friendly way. Her face looks pale and her eyes are closed. Her respirations are easy, but rapid. You ask her if she's okay as you grasp her wrist to take her pulse.

She responds that something is wrong and that her left side hurts. You mentally note her pulse is strong and fast. You ask her what happened to determine her MOI. She says that she slipped off the ice on the hill just above you and hit her left side hard and that it hurts to breathe. You ask if she was knocked out at all. She replies no and that she doesn't hurt anywhere else. What now?

ANSWER

Introduce yourself and explain that you are trained in first aid and ask if you can further assess her to get a better idea of what's wrong. She welcomes your help. You ask her name, where she's from, the date, and she answers all without issue, which means her mental state is sound. You then ask if you can check her injuries, and she again consents.

You put some freezer bags on your hands to serve as BSI since your snow mittens inhibit movement and feeling. You assess her head, neck, shoulder, and chest and all appear normal with no DCAP-BTLS (see Chapter 3). Both sides of her chest move equally when breathing, so you pull up her turtleneck and unfasten the button of her snow pants to check her abdomen. The upper abdomen looks normal, but as you palpate you discover she's very tender in the left upper quadrant and the muscles are tight in this area, almost rigid. At this point, she begins to vomit in the snow. The vomit has no display of blood and appears to be her last meal.

You stop and think: patient is alert and oriented but her pulse and breathing is fast, though not labored. Her radial pulse is strong. Her chest is fine, but her left upper abdomen is tender where she hit when she fell. You recheck the pulse again, counting it this time as 130 beats per minute and it seems weaker than before. Something must be going on internally, such as bleeding, which is making her exhibit signs of early shock.

The best thing for her is immediate evacuation. So you call 911 and treat the patient for shock by keeping her airway open, keeping her talking, and maintaining her core body temperature until help arrives.

SUSPECTED HEART ATTACK

Consider serious disease when a person complains of shortness of breath and weakness, has cold and clammy skin, appears cyanotic (bluish), and has a crushing, tight, or squeezing pain in the chest that may radiate into the neck, jaw, throat, back, arms, and shoulders.

In women, these signs can be more subtle. Often they do not feel the same chest pressure as men do and are more likely to have shortness of breath, nausea and vomiting, and/or jaw or back pain.

Using the SAMPLE history discussed in Chapter 3, find out if the victim has a history of heart disease or heart attack.

BUSHCRAFT TIP

After an angina attack, the person may look and feel normal, but after a heart attack the victim will look sick and be in obvious pain.

An individual who has angina (chest pain that is not a heart attack) will often carry medication to help relieve the symptoms. If this is the case, help her to a comfortable position and assist her in taking her medication. If the medication does not relieve the symptoms, suspect a heart attack.

If you do suspect heart attack, help the person to a comfortable position, sitting or lying, and give one aspirin (if available) or a tea of willow bark to help prevent blood clotting, which can make the heart attack worse. Give water but nothing else to eat or drink. The victim should be carried out immediately.

TIPS AND TRICKS

- Liquid Benadryl ingested moments after an allergic reaction may ease the onset of anaphylaxis.

- Massive blood loss is a major contributor to common injuries that bring on symptoms of shock. Understanding this can be vital to your well-being in the field. Yarrow is a very common plant found in every season that can be used for deep cuts.
- Any plant containing tannins will help stop bleeding, and can be used as a vulnerary (a plant used for healing wounds).
- Don’t forget that trees are great medicinals. Many species like oak, walnut, and poplar are high in tannins.

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Chapter 8

BREATHING ISSUES

“Regulate the breathing, and thereby control the mind.”

—B.K.S. IYENGAR

A number of different types of injuries and illnesses can cause breathing difficulties, from the common cold to pneumonia to chest trauma.

TREATING RESPIRATORY ILLNESSES

If you or one of your companions catch a cold, there aren’t many treatments other than staying warm and drinking a lot of fluids. Take a decongestant if you have one.

But some respiratory illnesses—such as flu, bronchitis, and pneumonia—are more dangerous. Flu (influenza) is a contagious viral disease that can cause severe illness, even death. It is more dangerous in children and the elderly than in otherwise healthy adults. Although the symptoms of the flu and the common cold can be similar—cough, sore throat—you can tell that you have the flu because it comes on suddenly whereas cold symptoms develop over time. With the flu, one day you’re fine and the next you’re not.

Be aware when treating someone with the flu that it is highly contagious and airborne (so it's harder to protect yourself from it). You are likely to contract it yourself. Signs and symptoms include a fever, body ache, cough, sore throat, chills, headache, vomiting, and diarrhea. Anti-inflammatory pain relievers such as Advil may help. Mild exercise can also help relieve some of the symptoms. If flu symptoms are serious, arrange for immediate evacuation.

If a cold isn't treated, it can develop into bronchitis, an infection of the lower airways. This isn't too serious (and a good preventative measure is not to smoke, since smoking damages your lungs, making you more susceptible), but it can develop into pneumonia.

Someone with bronchitis will be wracked by a persistent cough and spit up green or yellow sputum that sometimes shows traces of blood. He'll be feverish, lethargic, and congested. As with other respiratory illnesses, rest and plenty of fluids are the best treatment. If the ill person does develop shortness of breath and/or signs of pneumonia, arrange for immediate evacuation.

Pneumonia is an infection of the lungs. There are two kinds: viral and bacterial. Viral pneumonia is generally mild and people recover without any problems. People who contract bacterial pneumonias, however, generally become very ill and need antibiotics to recover.

Pneumonia symptoms (either type) include high fever; productive cough; chest pain, which worsens with deep breathing and coughing; and shortness of breath. One side of the chest may not fully expand during respiration. Like the common cold, pneumonia is irritatingly hard to treat outside of rest, keeping warm, and antibacterial drugs. If the patient doesn't seem to be improving within seventy-two hours, or if the symptoms are severe, you should seek immediate evacuation to emergency care. If you suspect that the victim has bacterial pneumonia prepare for immediate evacuation.

Recently there's been a lot of concern, especially in the southern United States, about the Zika virus. This is transmitted by mosquitoes, and although it shows flu-like symptoms (fever, rash, difficulty breathing, vomiting, chills, sweating, red eyes), it is much more serious. The biggest concern is that it can cause birth defects to children carried by pregnant women infected with the disease.

Currently there is no known treatment for Zika, so if you suspect someone of having it, concentrate on those symptoms you can relieve. Make sure the patient is getting plenty of rest and fluids and use acetaminophen for pain relief. Don't use ibuprofen or aspirin, and evacuate the patient as soon as possible.

TREATING A CHOKING PERSON

If you suspect someone is choking (for example, they are eating or drinking and suddenly start coughing and seem to be having trouble breathing), use the Heimlich maneuver to clear the airway. This involves standing behind the victim, placing your fist just below the sternum in the center of the body, and giving a series of quick abdominal thrusts, using your other arm to hold him in place. This forces air through the airway and can remove any obstacle. Do a quick sweep of his mouth to make sure everything has been removed.

If someone has a partial airway obstruction but can still talk, you should perform the Heimlich maneuver, just as you would if he were fully obstructed.

If a child has an airway obstruction, open the airway by placing your thumb on the tongue and first two fingers under the jaw, pinch together, and lift. If the object is visible, try removing it by sweeping it out with a finger. If you cannot see the object, place the child on her back on a firm surface and provide five abdominal thrusts with the

palm of one hand above the navel, but well below the sternum (chest bone). These thrusts will increase abdominal pressure and hopefully move the obstruction into view where you can sweep it out. Only attempt to remove an object you can actually see; otherwise, you may push it farther into the airway. Provide two rescue breaths and repeat this process until help arrives or the obstruction is cleared.

In the case of an infant, rest the baby face-down on your forearm, supporting the jaw and face with your hand. Keep the head lower than the rest of the body. Deliver five back blows between the shoulder blades with the palm of your hand. Place your free hand on the back of the infant's head, sandwich his body, and turn him over. Now take two fingers and give five chest compressions (or upper abdominal thrusts on a larger infant). If you can now see the foreign body, remove it. Repeat the cycle as many times as needed to remove the object.

If after removal of the obstruction the individual—whether infant, child, or adult—remains unconscious, perform CPR if necessary.

RECOGNIZING AND TREATING CHEST INJURIES

Chest injuries are more common than you might think. They are also extremely serious and require evacuation as soon as possible. They can involve damage to the heart and the lungs, two of the most important organs in our bodies. A chest injury can disrupt the victim's breathing, making it too fast, too slow, or irregular. If the heart itself has been injured, it may start bleeding into the pericardial sac (the sac that surrounds the heart). This compresses the heart and may cause it to stop altogether.

OPEN AND CLOSED INJURIES

An open chest wound is one in which the chest cavity is open. Closed injuries are internal. Both kinds of injuries require immediate treatment and probably evacuation.

Sometimes chest trauma results in a sucking chest wound or flail chest, which requires special treatment (see Chapter 4). Signs and symptoms to look for in chest injuries include pain at the site of injury, pain at the injury site made worse with breathing, shortness of breath, coughing or vomiting up blood, failure of one or both sides of chest to expand normally when inhaling, rapid and weak pulse, low blood pressure, and cyanosis of the lips and fingernails (they turn blue).

PRACTICAL SCENARIO

You're assessing a middle-aged woman with chest injuries and difficulty breathing. She hit a tree with her chest while tubing down a snow hill. She has cyanosis around her lips, and her respirations are forty-four breaths per minute, shallow and labored. During the trauma assessment, you ask to unzip her jacket and lift her shirt so you can look for paradoxical motion, which is when the chest moves inward during inhalation (instead of the normal outward motion) and moves outward during exhalation (instead of the normal inward motion). Are there any bruises or deformities? You assure her you are trained in first aid and will keep a blanket over her to keep her warm. The patient refuses to allow you visual inspection. You ask if you can get a woman off the slopes to help aid and she refuses.

ANSWER

The major issues are weather, risk management, and transportation related. Even though the injured woman has an elevated level of respiration and is in obvious distress, if she refuses your help, you cannot provide much more than emotional support until the time comes that she loses consciousness. There will be occasions when an injured or ill person is argumentative and downright combative.

In this case, the cold weather is working against you by sapping body heat away from the injured woman, making her injured body work even harder to maintain homeostasis. Risk management is a concern, because you don't want to leave an injured person unless you have to. Leaving her to get help could encourage her to try and move herself, thereby possibly worsening her injuries. Lastly, making a plan to get her to help is important; so long as she refuses your help, you may have to aid her in moving to get to her preferred help.

SELF-AID

Now, let's say *you* fall out of a tree stand. The strap (which you're supposed to wear!) breaks your fall but does so by constricting around your chest since it slid up violently from your belt line during the fall. Due to the pressure on the snap and your inability to breathe well, you cut the strap with your pocket knife and fall 12' to the ground, which again takes your breath away. You immediately begin to examine your chest as you struggle to catch your breath, and you feel the bottom few ribs sort of floating in place. You find it hard to breathe normal breaths and you're sore. What do you do?

First, try to remain calm. Take a piece of cloth or your hunting pack, dump its contents, and roll it into a ball to place it over your deformed ribs, which may be symptoms of a flail chest. Tape or hold this ball in place as you continue to relax and try to regain a normal breathing pattern. You put the old survivalin' acronym to use—STOP: sit, think, observe, plan. Sit and rest, think about your injuries and assess their severity, observe how you can treat your injuries, and create an actionable plan of treatment and evacuation. Once you do this and treat yourself as best as can be managed, decide if you will be able to attempt self-rescue by walking out. If not, hopefully you know that within a couple of hours after dark, someone will come looking for you if you have taken the time to plan properly. In that case, set up camp, stay warm, and remain calm.

Lung Injuries

Injuries to the lungs will impede normal breathing. If you broke a couple of ribs and one of them penetrated your lung, even though to an outside observer it might seem that there was nothing wrong, inside you the air will slowly drain from your lung until it collapses. Such a condition is called pneumothorax, or "air in the chest."

On the other hand, if there is bleeding into your chest (hemothorax), this can put pressure on the lung and cause it to fail. A symptom of this is that the victim's breath rate increases. The injured party can probably walk out on his own, albeit at a much slower pace than normal.

An injury to the lung may affect more than just the lung. After all, the air is pressing against all sorts of other organs, including the heart. Pressure on the heart, called tension pneumothorax, prevents blood getting to the heart in sufficient amounts. If the victim's neck veins are distended and his trachea is twisted and pushed to the side, he may have this condition. Tap his chest; the injured side probably sounds hyper-resonant.

If this is the case, start plans to evacuate, since the patient will need professional medical care.

TREATING ASTHMA

Asthma is widely spread in the United States; a 2009 study found that 25 million people, or 8 percent of the population, suffer from it. It can include coughing, wheezing, or shortness of breath. Asthma is usually controlled by medication, which is often administered by an inhaler.

Asthma attacks can be mild, severe, or, in extreme cases, life-threatening. Look for shortness of breath and difficulty expelling air from the lungs.

To treat asthma position the victim in a manner that promotes easy breathing (for instance, sitting upright, hands pressed against the knees—this is called the tripod position). Help with any medications, and give the person clear fluids. If, after two hours, the patient is still have trouble breathing, it's time to evacuate.

TREATING HYPERVENTILATION AND SHORTNESS OF BREATH

If someone gets stressed out they can start to breathe far more rapidly than normal (the average person takes between twelve and twenty breaths a minute). If they continue to do this they'll start to feel dizzy and experience a tingling in their extremities. All of this will probably stress them out more, compounding the problem. Since these are also symptoms of heart attack, affected individuals may believe they are having a heart attack. See Chapter 7 for more information about suspected heart attack.

BUSHCRAFT TIP

Respiratory alkalosis, a severe condition, occurs when carbon dioxide levels in the body drop too low, primarily due to hyperventilation. Signs and symptoms include dizziness, bloating, feeling lightheaded, numbness and/or muscle spasms in the hands and feet, discomfort in the chest area, confusion, dry mouth, tingling in the arms, heart palpitations, and feeling short of breath. Treatment requires an increase of carbon dioxide absorption. Having the patient exhale in a paper (not plastic) bag and inhale the carbon-dioxide rich air will aid in reducing symptoms. Providing psychological support will alleviate anxiety.

The best way to treat cases of hyperventilation is to begin by reassuring and calming the victim. If she's stressed out about something in particular, see if you can remove it or remove her from its vicinity. Tell her to take deep, slow breaths. Count them out for her. If she is still hyperventilating, there may be an underlying cause, and you'll have to probe deeper to find out what it is.

TIPS AND TRICKS

- When you use an occlusive dressing to seal a chest wound, note the material used, whether three or four sides were taped down, and any changes observed afterward such as vitals, breath sounds, skin color, and the injured person's level of anxiety.
- To treat hyperventilation, breathe through only one nostril, which lessens the amount of oxygen you're taking into your lungs. For the second approach to be useful, the mouth and the other nostril need to be covered.
- Mullein is a plant with direct affinity for the lungs. You can use this plant for many simple breathing issues that are non-injury-related. Make an infusion (tea) from the leaves of this plant and drink about 8 ounces three times daily until you are breathing better. You can also use this as a vaporizer of sorts by covering the head with a towel and inhaling the steam (at a safe distance).

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Chapter 9

NEUROLOGICAL ISSUES

“Take care of your body. It’s the only place you have to live in.”

—JIM ROHN

While neurological issues tend to be serious, that does not mean you are helpless should one occur in the wilderness without medical help nearby. There are often steps you can take to minimize damage until help can be reached.

IDENTIFYING STROKE

Strokes are more common than we’d like them to be, and they can be quite serious. If someone in your wilderness party suffers a stroke, that person should be taken out of the wild as soon as possible. Sometimes called a cerebrovascular accident (CVA), a stroke interrupts the blood flow to the brain. This, in turn, will often cause slurred speech and loss of function in the limbs.

When they have no blood flow, brain cells die. Even though this process may take a couple of hours, the

damage has been done. Occasionally a little blood gets through but it’s not enough for the cells to work normally.

There are a few types of strokes, but we will address the most common here.

When there’s bleeding in the brain, the victim suffers a *hemorrhagic* stroke. People who suffer from prolonged cases of elevated blood pressure are at most risk for this type of stroke.

If a blood vessel is blocked (for instance, by a blood clot), blood to one part of the brain is cut off. This is called an *ischemic* stroke. Those suffering from high cholesterol or atherosclerosis are at the highest risk for this stroke.

Sometimes when a clot has blocked a vessel, it breaks free quickly. This creates a *transient ischemic attack* (TIA), also called a mini-stroke. It takes about twenty-four hours for normal functions to be restored. TIAs may come as a series of attacks. Any TIA is your body warning you of a forthcoming crisis.

Signs of a stroke:

- One side of the face droops and looks immobile. The victim can’t move that side of the face well.
- Arm drifting: if the affected individual holds both arms out with palms up, one arm will drift down.
- Slurred speech: the affected individual has trouble forming normal speech or can’t repeat a sentence when asked.

Any person suffering a stroke needs to be evacuated as soon as possible. Place the victim on a backboard with the paralyzed side down. Put a blanket under his head and elevate the head to 6". Describe exactly what happened to the EMS people who are carrying him out.

PRACTICAL SCENARIO

During an outdoor class, one of your instructors suddenly develops a slur in his speech and exhibits a droop to one side of his face and numbness in his hand. He suddenly falls over and as you reach him, he opens his eyes and begins to stand. He walks toward another instructor but in a sideways motion, nearly walking in a circle. What do you do?

ANSWER

As you reach him, you calm him and perform a quick stroke scale: you ask him to smile showing his teeth, which he is unable to do on one side. You then ask him to hold his arms in front of him with palms up. Both arms move, albeit one slower than the other and the slower arm drifts off to the side. Lastly, you ask him to say, “The sky is blue in Cincinnati,” which he is not able to do without badly slurring his speech.

He does not pass the Cincinnati stroke scale, so you take vitals and signal to another instructor that immediate evacuation to medical care is needed. A stroke is an emergency, so you should spend as little time as possible where you are in case conditions worsen. Because the affected person is alert and able to walk with assistance, you walk him side by side to meet the ambulance in a nearby parking lot to transfer care.

HELPING SOMEONE WITH SEIZURES

If you are traveling with someone who has a seizure disorder, make sure you understand what his seizures look like (an absence seizure may resemble someone lost in thought whereas a generalized tonic-clonic seizure results in complete loss of body control, convulsions, and unconsciousness). Ask him what to do in the event a seizure occurs.

Most seizures are brief, so if you happen to arrive on the scene of a seizure, it will usually be after the seizure has taken place and the individual is recovering. If the victim is in a dangerous area when a seizure begins, move him as quickly as possible to a safe area. Encourage the victim to sit comfortably and recover. When he’s fully responsive, you can begin to discuss what happened. Symptoms of a seizure include repetitive movements of the limbs and inability to respond when spoken to. Seizures that go on for more than three minutes or seizures in pregnant women require immediate medical attention.

BUSHCRAFT TIP

High altitudes, particularly cold atmospheres, can cause seizures even in people who do not have a known seizure disorder and can exacerbate seizures in those who do. Stress, fatigue, and other illnesses or injuries can make a person with seizure disorder more likely to experience a seizure.

If someone is suffering a seizure, start as you would with any injury. Check the airway for blockage. If the seizure has stopped, there's a good chance the victim is breathing heavily and that his heart rate has increased. If these don't start to come back down after a few minutes, something besides the seizure may be going on.

Once the seizure has passed and the affected individual is recovering, perform a physical exam, LOR (level of responsiveness), SAMPLE history, and assess for weakness or loss of sensation in body parts. Keep the patient warm and follow the same procedures you would if he were in shock. Evacuate immediately if the cause of the seizure is unknown or uncertain, the seizure accompanies illness or injury, recovery is delayed, or status epilepticus occurs (that is, seizures continue without recovery between them).

WHAT TO DO ABOUT FAINTING

Fainting is what happens when the nervous system has a sudden reaction that briefly reduces blood supply to the brain. Because of this the brain temporarily stops functioning and the patient faints. People can faint from fear, surprise, bad news, or any strong emotion. Fainting can also be caused by physical conditions such as heart problems.

Fainting is similar to shock, and you should treat it the same way you would treat someone undergoing shock. Once the individual has regained consciousness, recheck vitals and monitor over the next several hours to see if the

condition worsens. If vitals remain stable, nothing more needs be done; if, however, vitals decline, look to evacuate.

CARING FOR HEADACHES AND MIGRAINES

Headaches—which we all get at some point—aren't usually taken very seriously; you can relieve them with over-the-counter medicine or by lying down in a dark room for a while. In the wild, the latter option isn't available to you most of the time. There can be many different causes, including altitude, snow glare, or just the exhaustion of your body engaging in vigorous exercise. In some situations, of course, a headache is a sign of something more serious. In any case, a persistent headache should ring alarm bells for you.

Begin by checking for a head injury. Look into the subject's eyes and see if one pupil is dilated more than the other. Feel his forehead. Is it warm? Is he balancing okay?

If the subject is vomiting and hasn't been able to sleep or eat properly, and if this is an ongoing condition, prepare to evacuate the patient. As long as it remains mainly a headache, he can probably walk out under his own power.

Migraines can cause more disability than a typical headache because of their severity and the fact that they often cause nausea and vomiting. These are recurring headaches with pain that is usually focused on one side of the head. They often include light sensitivity, so the sufferer will be more comfortable away from bright sunlight. People susceptible to migraines occasionally report an "aura" (changes in their vision, such as seeing spots) when one is coming on. Individuals with a previous diagnosis of migraine will usually have medication to treat the symptoms; help the person take it. If migraine medication is not available, over-the-counter pain relievers and natural remedies (see Chapter 16) may help.

SELF-AID

Headaches can be brought on because of muscle strain in the neck and shoulders, which can happen when you are exerting yourself in unusual ways. Make sure to take breaks when you're doing unaccustomed labor, and stretch your shoulders and neck regularly. Also, an improperly fitted or too-heavy backpack can bring on headaches through muscle strain. Make sure your backpack fits well and is not overly heavy.

Plants such as willow bark make a pain-relieving tea you can consume to help with mild headaches. A cooling fomentation on the forehead made from a tea (cold infusion) of mint or sumac berries will work to help ease mild headaches as well.

TREATING INJURIES TO THE HEAD AND SKULL

There are two main types of head injuries that involve the brain and the bones of the skull: concussion and skull fracture.

CONCUSSION

A concussion is a brain injury that occurs when a blow to the head moves or shakes the brain, interrupting brain function (often just for a few moments). Back-and-forth movements, like those that happen if you're tackled from behind (such as when playing football) or rear-ended by another car, are especially damaging to the brain. In the wilderness, concussions are often the result of an ATV accident or a fall. Even a mild blow, such as bumping your head on a tree limb, can cause a concussion.

Any injury that can cause a concussion may also cause an injury to the spine, so check for spinal injury during your assessment. If the pupils fail to respond to a flashlight shined in them, or are unequal, or there is a loss of feeling in the body, or vital signs deteriorate, the person may have a spinal injury.

Although the injured person may "shake it off" and feel okay afterward, do not leave him unattended or let him walk around. The brain may be bruised or bleeding, which can result in confusion, coma, or death.

It’s okay to let the injured person sleep, but wake him every two to three hours to check LOR. A headache that gets worse can be a sign of swelling in the brain, causing pressure in the skull.

Treat a concussion as you would shock—protect the airway, keep the person warm, and evacuate immediately.

SKULL FRACTURES

Skull fractures can occur with any head injury, such as from a fall, an ATV or other motor vehicle accident, or from being struck by a falling tree limb or other blow. Like other bone fractures, skull fractures may be open (the bone breaks through the skin) or closed (the bone does not break through the skin).

Check the skull for bone edges, bone fragments, or a depression near the site of the injury. These are all signs that a fracture has occurred. If fluid drips from the nose or ear, it may be cerebrospinal fluid (CSF), indicating a skull fracture or other injury near the spine. To check if a fluid is CSF, take a light-colored cloth and dip a corner into the fluid. If it dries with a yellow halo around the edge, it is CSF; the same yellow halo will occur even if the CSF is mixed with blood.

Cover any open injury with a sterile dressing. Use a doughnut-style dressing to protect the fracture. Evacuate immediately.

TIPS AND TRICKS

- If a person is having a seizure near a cliff or waterway, she should be moved and secured in some way if possible.
- Seizures can result from sudden high fevers in children. Although such seizures are usually well tolerated by

children, transportation to medical care is necessary to rule out serious conditions.

- Some people who have had a stroke may be unable to communicate in any way, but they can often hear everything going on around them. Be aware and choose words carefully.

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Chapter 10

ABDOMINAL ISSUES

“Those who think they have not time for bodily exercise will sooner or later have to find time for illness.”

—EDWARD STANLEY

Organs such as the liver, kidneys, and intestines are often vulnerable to injury both on their own and sometimes from other parts of the body. A broken rib, for instance, can rupture the spleen. If the liver or spleen is badly lacerated, it will bleed heavily, filling internal body cavities and possibly sending the patient into shock. Someone with an injured spleen will probably feel pain in the left shoulder.

If the patient complains of lower back pain, and her urine shows traces of blood, this may be a sign that one or both of her kidneys have been damaged. If the hollow organs such as the stomach or intestines rupture, the patient will suffer intense pain, inflammation, and bloating caused by digestive juices and toxins being released into the body. Such an event can cause infection throughout the lower body cavity. People with serious internal injury will often try to protect the area by holding the stomach/lying in a fetal position. The abdominal muscles will become very rigid and the injured person cannot relax them (guarding). Blood may also appear in the stool; dark, tar-like blood

means bleeding in the stomach or intestines while bright red blood probably just means hemorrhoids.

BUSHCRAFT TIP

Before you begin any vigorous activity, especially one in which a fall is possible (skiing, for example), it's a good idea to empty your bladder. If your bladder's full when you fall, it could rupture and detach from the urethra (the tube through which urine exits the body).

A pelvis fracture can also injure the bladder and the bowels. Sharp bone ends could puncture one or the other.

TREATING OPEN AND CLOSED ABDOMINAL INJURIES

Open abdominal injuries mean there is a puncture or protruding bowel or fat. Closed injuries do not have tears penetrating the abdomen. If the patient has no obvious injuries in the area, take a look at the skin color. Don't confine your examination to the front; also look at the sides and back. Pooling blood, if present, will look like a large bruise on one side of the body. Distension, which in this case is the accumulation of gas or fluid in the abdominal cavity, causes the abdomen to expand beyond its normal girth, similar to pushing your stomach out acting like you're pregnant. Pooling blood, distension, and rigidity are all telltale signs of an internal abdominal injury.

Open injuries require additional protective measures. When something has penetrated the body around the abdomen, do *not* remove it. It's possible that object has sealed a leak in an organ. If you remove it, the organ (especially if it's the liver or spleen) could start to hemorrhage, sending the patient into shock.

Hard as it is, even though something is sticking out of your patient's abdomen, resist the urge to pull it out; instead, pad the area and find a way to hold the padding in place. If you're only moving the injured person a short

distance, this will work. If it's going to take a long time, you may have to pull out the object to avoid the risk of infection. You need to watch very carefully for bleeding.

If you're dealing with fat or bowel material that's sticking out through an opening in the skin, you can either try to press the material back into the cavity and then dress it and put a bandage in place to secure it, or you can cover the area with a moist cloth to keep the wound from drying out. Don't push anything into the wound (least of all your finger) and keep the area as undisturbed as possible. Keep the wound moist during transport. Don't push the material in if it's torn, since that could cause it to leak into the abdominal cavity, causing more damage.

BUSHCRAFT TIP

The abdomen is a tricky area, one best left to medical professionals. If the patient complains of abdominal pain, evacuate her as quickly as possible. Don't poke and pry on your own.

If you are not certain of the severity of the injury, watch the injured person over several hours. The pain may become so great the injured party wants to evacuate, or other issues, such as deteriorating vital signs, may occur, which will indicate it is time to arrange evacuation. Alternatively, the injury may not be serious, and as long as the injured person's condition remains stable, evacuation does not need to be rushed.

If the victim has had an internal injury, there may be bleeding and even an infection. Calmly interrogate the patient to find where he's feeling pain and discomfort. Are there external signs such as vomiting? Check the patient for dehydration, particularly in the case of vomiting and/or diarrhea. Feel his abdomen to see if it seems rigid. Is there swelling anywhere?

If yes, evacuate the injured person as soon as possible, because more serious internal injuries that cannot be

treated in the field will soon manifest. Treat for shock and evacuate.

In the case of a serious injury, do not give food. The slow sipping of fluid is okay (no alcohol, milk products, or caffeine drinks), and you can give antacids, which will aid in soothing the stomach. For additional comfort, you can use a warmed canteen of water as a heat pad for the area. Be prepared for vomiting, and help the injured person find a position of comfort. Often this will be lying on his side with knees bent. Do not give solid foods or laxatives.

PRACTICAL SCENARIO

You're hiking with your child on a common trail near your home when she suddenly trips and falls onto a broken stump. It lacerates her stomach, and as you roll her over you find that she has intestine protruding through a hole in her abdomen with some blood and a lot of trail debris. She's crying and trying to hold her stomach, so she's alert. You attempt to calm her and fail, but she allows you to treat her. Now what?

ANSWER

You begin by rinsing the debris off her with your water bottle, then carefully lifting her shirt to gain better access to the injury. The hole is small, but with the cool water, cool breeze, and open wound, she's already complaining of being cold. Once rinsed for a second time, the injury isn't bleeding much, so you apply a dampened bandanna to the wound to keep it covered and moist. Because it's not below freezing, there's no reason to attempt to push the protruding intestine back through the abdominal cavity. You apply a second damp bandanna to the wound followed by a used, but clean enough, sandwich bag. You hold it in place because you have no tape and instruct your daughter to hold steady pressure on the wound as you carefully lift her in a cradle carry to get her back to the house where you can call 911.

TREATING NAUSEA AND VOMITING

If a patient is vomiting or is nauseated, this could be a symptom of a larger problem. The first thing is to get the patient to the point she can keep down fluids; otherwise she may become dehydrated. Give her a chance to rest and let her eat small amounts of carbohydrates. She should not have meat or milk for twenty-four hours; if at the end of

that time she's feeling better, you can start her on meat, but in small amounts.

These symptoms are associated with many illnesses or injuries, ranging from head injuries all the way to stress. If the patient shows no other symptoms and appears to recover from the nausea, you can continue your hike, but keep a close eye on her.

SELF-AID

If you suspect you are vomiting or have stomach cramps because of contaminated food or water, charcoal from the fire may be a quick help. Mix charcoal with water in a slurry and consume about 8 ounces. You can eat the charcoal alone, but the slurry is a bit easier to consume quickly. If this makes you vomit do not be concerned, as the charcoal will absorb some of the toxins even if you cannot keep it down at the time.

EASING DIARRHEA AND CONSTIPATION

We're sure that at some point in your life you've had the unpleasant experience of diarrhea. There are many different causes, including food poisoning and various diseases. The big danger to the patient is dehydration, since each bowel movement is releasing a lot of fluid as well as stools. Concentrate on getting the patient safe drinking water. If the patient's urine turns dark yellow, increase the amount of fluids you're giving him. Gradually put him on a carb-heavy diet, avoiding milk and coffee (since caffeine acts as a laxative).

The other side of this is constipation, which can be very painful. Try changing the patient's diet, but stay away from alcohol, bananas, cheese, and other foods that tend to help bind stools tighter together.

BUSHCRAFT TIP

Astringent plants taken as an infusion will help to bind things a bit if you're suffering from diarrhea. Any plant or tree that is high in tannins is an astringent. Common plants such as yarrow and goldenrod that work well for bleeding are also great candidates for

stopping diarrhea. Trees like oaks are also high in tannic acids. Use the inner barks (in emergencies, the leaves will work as well). Crushed acorns are filled with tannin and can be chewed if the means to make an infusion are not available or convenient.

HEMORRHOIDS

While blood in the stool can seem like a scary sign, a small amount of bright red blood is likely from hemorrhoids (swollen veins in the rectum) and not from a more serious illness or disease.

Hemorrhoids often develop after constipation, especially if one strains to push out the stool. Make sure the affected person drinks enough water and eats enough fiber, as this can help clear up hemorrhoids.

Sometimes the bowel itself protrudes from the anus (prolapsed bowel), causing discomfort. If this happens, have the affected person get on his knees and elbows with the buttocks higher than the head and apply gentle but steady pressure to the protruding bowel tissue until it slips back inside. Have the person remain in this position (or lie on his side) for thirty to sixty minutes to help make sure the problem doesn’t recur.

Dark blood in the stool or black stools are more serious signs and could mean anything from a tumor to an infection, so a consultation with a medical professional is indicated. If abdominal cramping, vomiting, or changes in the vital signs occur along with the dark blood or black stools, seek immediate evacuation as it is possible the affected person could go into shock from blood loss.

HERNIAS

A hernia is typically caused when part of the intestines (or another organ) push through a weak spot in a muscle (often the abdominal wall), creating a bulge. For anatomical

reasons, men are more likely to get hernias than women. The most common place for hernias to occur is around the groin/upper thigh, although they can also occur throughout the abdomen. Most hernias do not require urgent treatment. If you or someone in your group is experiencing a hernia and it is causing discomfort, the protruding intestines can often be coaxed back into place if the affected person relaxes and presses them in.

If a hernia becomes strangulated—that is, the protruding intestine or organ is cut off from its blood supply—it requires immediate surgery. A strangulated hernia cannot be pressed back into place, has a firm bulge, and causes increasing amounts of pain. Vomiting may accompany the pain, and the pain may spread throughout the abdomen. There is no effective treatment for this in the wilderness, so evacuate immediately.

TIPS AND TRICKS

- Abdominal injuries are sometimes associated with fractures or traumatic brain injuries. So a thorough physical exam is necessary.
- Keep people with abdominal injuries warm and in the greatest position of comfort. Straightening legs and a lot of movement will increase their pain.
- Open abdominal wounds radiate interior heat quickly, so hypothermic treatment may be required in cold or wet conditions.

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Chapter 11

URINARY AND REPRODUCTIVE SYSTEM ISSUES

“It is health that is real wealth and not pieces of gold and silver.”

—MAHATMA GANDHI

Urinary tract and reproductive system problems can crop up out in the wilderness. These are likely to be illnesses rather than injuries, although injuries to these areas of the body can occur. If that’s the case, refer to Chapter 10: Abdominal Issues, for more information on general treatment approaches.

TREATING PAINFUL URINATION

Pain during urination is often caused by some type of infection of the urinary tract. These issues can be eased by drinking plenty of liquids including acidic fluids and juices (such as orange juice or cranberry juice). Avoid sexual intercourse while dealing with any urinary infection.

For urinary tract infections caused by bacteria, antibacterial teas may help. Yarrow and plantain are good choices for this condition. Goldenseal will help stop bacteria from sticking to the bladder walls, helping you avoid infections as well.

Urinary tract infections can turn into kidney infections, potentially damaging the kidneys or causing a life-threatening infection, so medical treatment should be sought if the infection does not clear up quickly.

BUSHCRAFT TIP

It's possible—especially if you're an older man with a history of prostate troubles—that you experience difficulty in urinating. If this happens when you're in the wild, you should avoid drinking fluids until you can either urinate or, more probably, until you can walk out and seek professional medical assistance. Some ways to stimulate urination include:

- Putting your hand in a pot of warm water
- Rubbing the front upper part of your thighs while standing

STAY WELL HYDRATED

Staying well hydrated is essential to urinary system health. The color of your urine shows how hydrated you are. If your urine is clear, you're well hydrated. The less hydrated you become, the darker and more yellow the urine is. (That's why in the morning, after you've been sleeping all night, your urine is generally darker.) If your urine turns brownish, you are severely dehydrated, and it's essential for you to drink some fluids.

PRACTICAL SCENARIO

Your survival class partner has been complaining of a headache, which has been growing in intensity as you continue down the trail. You've been collecting squaw wood for the past hour, and your 55-gallon drum liners are only halfway full, so you have a long way to go before getting back to camp. He suddenly begins vomiting and becomes very lethargic. He says he's been drinking his water but still has three-

quarters of a full bottle. He says he's not urinated since he got to class. It's a beautiful day, full sun, and 70 degrees. Now what?

ANSWER

You tell him to drink some more, catch his breath, and relax a few minutes, which he happily does. About ten minutes later he again begins vomiting and can barely walk. Treatment for this patient is rest and rehydration. Once a patient begins to exhibit signs such as these, it's hard to get rehydrated without ample rest, water, and electrolyte intake. Many people operate daily in a decreased level of hydration—urine color should be straw yellow at the least and you should be urinating at least every two hours. Remember, salt and sugar are important too, so eat a light snack while rehydrating to aid in the replenishment of much-needed electrolytes.

COPING WITH KIDNEY STONES

Your party is walking along a path when in front of you a man doubles up, clutching his abdomen. When you reach him to start an examination, he's retching, which soon turns to actual vomiting. As you put your hand on his forehead, you realize he's running a fever. What's going on?

One explanation for these symptoms is the man has a kidney stone. This could be the cause of the sudden pain in his abdomen, as well as the vomiting and fever.

Kidney stones are crystals that form when the body is unable to dilute certain substances sufficiently and they clump together instead of being excreted from the body. Kidney stones can cause a lot of pain. Some stones are too large to pass on their own and require medication or medical procedures (such as shock-wave therapy) to treat.

While making plans for evacuation, increase the fluids the patient is consuming. It's possible that he'll pass the stone, although it's not an experience he'll care to remember. Meanwhile, concentrate on getting him out of the wild as quickly as possible.

BUSHCRAFT TIP

Many field edge plants like gravel root and queen of the meadow have been used for centuries to help break down kidney stones. You can take them as an infusion or simple tea, but they are more effective if the rootstock is used as a decoction.

PAIN IN THE LOWER ABDOMEN

Any sort of severe pain in the lower abdomen is cause for concern, since it may indicate problems with intestines or kidneys and urinary tracts. The safest course is to evacuate the patient. Give fluids as tolerated, treat for possible shock, and evacuate.

MENSTRUAL AND PREGNANCY-RELATED ISSUES

If a woman suffers heavy menstrual bleeding (continuous over twenty-four hours) and she does not have a known medical condition that accounts for it, this may be a sign something significant is wrong. Let the patient rest until the bleeding slows and returns to its normal state. While the patient is resting, give her plenty of fluids. If the bleeding doesn’t lessen within twenty-four hours, take steps to evacuate her.

There are several herbal teas that work well for menstrual cramps. Yarrow is one of the best, but raspberry leaves work well too. Black cohosh root is probably one of the most famous, although being a rootstock preparation, it needs to be concocted, not just brewed as a simple tea.

If a woman is pregnant less than twelve weeks, heavy bleeding may signal an ectopic pregnancy (a pregnancy in which the embryo is attached outside the uterus) or a miscarriage. If the pregnancy is more than twelve weeks, the bleeding signals a miscarriage or premature labor. If the woman passes some spongy tissue, she’s had a miscarriage. In any case, she should be evacuated as quickly as possible.

BUSHCRAFT TIP

If a man has suffered an injury to his pelvis or spine, one symptom may be that he gets an erection that will not go down. This condition is called priapism and is a sign—if you need one after a spinal injury—that the patient needs to be evacuated.

TIPS AND TRICKS

- When hammock camping, nocturnal leg cramps (“charley horses”) are typically due to dehydration. Drink water and maybe have a light snack to replenish salts and sugars for a better night’s rest.
- Packets of Jell-O make for an excellent rehydration drink. Add enough to taste in a water bottle and drink. The ingredients aid greatly in replacing lost electrolytes.
- Should you run out of pads during a menstrual cycle, take a folded-over bandanna and place absorbent material (such as moss) inside to serve as a temporary pad.

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Chapter 12

ACUTE AND CHRONIC ILLNESSES

“One of the hallmarks of the veteran woodsman is the way he contrives to make himself comfortable in camp.”

—WARREN H. MILLER

Many people with chronic illnesses, such as diabetes, can enjoy outdoor adventures with careful management of their situation. The same is true if you happen to come down with an acute illness (a cold, for example). However, sometimes the stress and exertion of being in the wilderness can create a complication with a known illness. In that case, you need to be prepared to take the right steps to deal with the problem.

DIABETES IN THE WILDERNESS

Those who have type 1 diabetes are perfectly capable of going into the wild and enjoying the amazing bounty of nature. They can live healthy, long lives so long as they continue proper treatment. Those with type 1 diabetes may carry an insulin pump to ensure the presence of insulin in

their bodies. If you have type 1 diabetes or someone in your group does, be sure to schedule appropriate stops for medication administration and meals.

Type 2 diabetes occurs when the cells become insulin resistant, requiring more insulin to use blood sugar (glucose) as a fuel. Type 2 diabetes can be controlled with a combination of diet and exercise, but with either type of diabetes, the same problems occur when fuel and insulin get out of balance.

BUSHCRAFT TIP

Diabetics who are involved in physical exercise such as hiking in the wild generally take less medication than those who remain sedentary. In any case, their mealtimes need to be regular.

If you have diabetes, before you leave for your trip into the wild, tell your group leader about your condition. Talk to your doctor about what you should take with you as snacks and food. Be sure to give the group leader the telephone number of your physician in case of an emergency. Bring extra supplies that can be accessed in an emergency, including supplies of insulin.

An emergency diabetic supply may include oral and/or injectable medication and the supplies needed to administer injectable medication (syringes, needles, alcohol wipes). Make sure someone other than the person with diabetes understands when and how to use the emergency kit.

HYPOGLYCEMIA

Hypoglycemia (too little sugar) means that the person with diabetes has run out of fuel. This may happen because the person waited too long before eating or took more of her medicine than was prescribed. Someone who’s hypoglycemic will be pale and sweaty. She may feel dizzy,

weak, or faint. Her limbs shake, and she's snappish and without much energy. She may drool and complain of numbness in her hands and feet.

Give her some sugar (a very small amount) and watch her closely. If you have a sugar cube, have her put it under her tongue.

HYPERGLYCEMIA

Hyperglycemia occurs when there is not enough insulin to bring sugar (glucose) to the cells, meaning the blood sugar level is raised. This condition is extremely serious, since delayed medical treatment can result in the patient slipping into a diabetic coma.

A hyperglycemic person shows signs of dehydration and dim vision. His skin is red and warm to the touch, and his pulse is weak and fluttery. His breath may be sweet, and he may vomit. He feels intense thirst and needs to urinate often.

The treatment for this condition is insulin. If you don't have any, make immediate preparations for evacuation. While waiting for rescue, have the patient drink as much as possible, since this will reduce the sugar in his blood.

INSULIN SHOCK

If a diabetic misses a meal or accidentally takes too large a dose of insulin, she can experience insulin shock. She'll complain of dizziness and feel sweaty and faint. This is a serious medical emergency, and you should arrange to evacuate the victim immediately.

KETOACIDOSIS

Ketoacidosis is a life-threatening condition that occurs when there is not enough insulin in the body to use blood sugar as a fuel. The body instead uses fat as fuel, which

leads to a buildup of ketones, a type of acid, in the body. Someone suffering from ketoacidosis looks much the same as someone with hyperglycemia: he's flushed, his skin is warm and dry, he breathes deeply and fast, and his breath smells fruity. He's extremely thirsty and urinates often. Have him drink a lot of water to wash away the sugar in his blood and prepare him for rapid transport to emergency care as there's no further treatment in a remote location.

ALLERGIES AND HIVES

People with common allergies, such as allergies to ragweed pollen, often avoid the outdoors during prime allergy season to reduce their symptoms. It makes sense for people who have a lot of allergies in the early spring to avoid camping in the early spring. People with plant allergies can also plan to avoid areas that will trigger them. For example, the American Academy of Allergy, Asthma, and Immunology offers an online resource that allows allergy sufferers to see local pollen counts in various parts of the United States and Canada. If you have allergies and know what pollens are most likely to trigger your allergies, you can plan your trip accordingly.

SELF-AID

If you suffer from plant allergies, you can still enjoy the wilderness even if it makes you sneeze. Here are some tips to help you make camping with allergies a bit more enjoyable:

- Prepare your medicine in advance. If you have severe allergies or asthma, bring a first-aid kit with an extra inhaler, epinephrine injectors, and anything else you might need in an emergency. Make sure that your fellow campers know about your condition and tell them who to call and what to do if you experience serious symptoms.
- Keep covered at night. Camping in a good tent can aid in limiting allergens that blow about at night. A tent with a good, tight window screen or hammock with the same technology will enable you to limit the amount of allergens that come into direct contact with you, at least for your periods of rest.

- Have a cup of tea. Warm teas infused with raw honey, local to the region you're in, will do wonders in alleviating allergy symptoms.

Hives are itchy and annoying and should be taken seriously. They're usually caused by an allergic reaction to something—pollen, plants, food, or insects. Sometimes an infection can produce hives as one of its symptoms. They typically appear as pink blotches on the skin, bumpy and slightly swollen. They normally pass within one day to one week and may become itchy. They can precede anaphylactic shock, so keep an eye on anyone who breaks out in hives. Antihistamines and other topical ointments such as Burleigh Balm are very effective for calming down hives. See Figure 12.1.

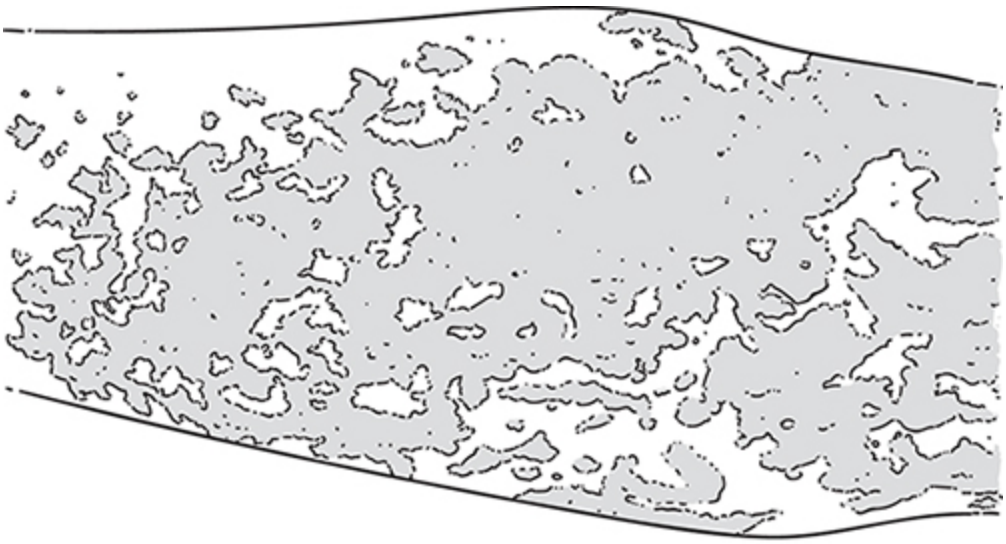

Figure 12.1. Hives on the arm

BUSHCRAFT TIP

Hives, contact dermatitis from plants such as poison ivy and stinging nettle, and heat rash can be treated with antihistamine plants such as jewelweed (they are also anti-inflammatory). Crushing the fresh plant stems and rubbing them on the affected area is good quick treatment.

TREATING ANAPHYLACTIC SHOCK

A severe allergic reaction that occurs immediately after exposure to an allergen such as an insect sting is called anaphylaxis or anaphylactic shock. This life-threatening reaction can close off the airway, making it impossible for the affected person to breathe. Additionally, the shock to the body can cause circulatory collapse.

Signs of anaphylaxis include severe itching or hives; shortness of breath; severe sneezing, coughing, and/or wheezing; swelling of the throat, face, tongue, or mouth or feelings of tightness in these areas; seizures and/or loss of consciousness.

Speed is called for here, since the shock occurs very quickly. Check the patient's airway to make sure it's clear, and do the ABCs. To treat this kind of shock, you need epinephrine. Most people who suffer from known anaphylaxis already have and carry an epinephrine autoinjector with them. These are prescribed medications.

You can use an asthma inhaler or decongestant spray if you don't have access to epinephrine. After the immediate crisis has passed, the patient should take 25–50 mg of Benadryl every three hours for twenty-four hours.

PRACTICAL SCENARIO

A person attending a bushcraft rendezvous begins experiencing shortness of breath and appears to be swelling up and turning red after tasting a plant during a group plant walk. You ask if she is allergic to anything and she replies, "No." Her throat begins to close and she starts to panic as hives begin to appear. Now what?

ANSWER

You happen to have a nasal decongestant spray, so you offer it to her. This seems to help, but not stop, the symptoms. Another person in your group has a first-aid kit containing liquid antihistamine, which you also offer to the affected person. She drinks probably more of it than she should, but it begins to ease her panic and arrest current symptoms. You continue to monitor her airway, breathing, and circulation while instructing her to get into a position of comfort.

Another bystander has gone to get the camp medic, but it will be at least ten minutes before he arrives at the medic station. As you continue to monitor the patient, after five

minutes, symptoms appear to have slowed in their progression, but they are still progressing. The person's face and throat are continuing to slowly swell. Without an epinephrine injection, she may not be able to maintain an open airway much longer. Hopefully the medic en route will have some, so you consider having the team move the person, using a stretched blanket and four bystanders in your group, to meet the medic in order to speed the treatment process.

COLD AND FLU

Some tips to remember should you be caught in the field with cold or flu symptoms:

- **Drink plenty of fluids.** Keep a water bottle in hand and make sure no one else drinks from it. Water is the best thing to drink, but watered-down fruit juice can be good, too, as can a cup of tea. If you're unable to keep much water down because of a stomach bug, you'll want to drink something with electrolytes.
- **Have a book or two.** When you're sick at camp you're likely to miss out on activities your friends may be doing, so have a book or two available to occupy your mind between naps. Ample rest is needed for a speedy recovery.
- **Eat, even when you don't want to.** Having some food in your stomach will strengthen your body and boost your immune system, so eat unless you're fighting a stomach bug that rejects everything you attempt to put in it. In those cases, electrolyte-rich drinks are helpful.
- **Let common sense prevail.** If you need rest, rest; if you need a break, take it—don't push yourself beyond your limits while ill, otherwise you could increase the illness or possibly injure yourself and then have an unnecessary trauma to contend with.

PREGNANCY

Many pregnant women enjoy the great outdoors late into their pregnancies. However, some precautions should be taken. Overheating is dangerous in the first trimester and is suspected of causing abnormal developments in the fetus. Be sure to dress appropriately for where you're hiking.

Exercise is your friend. If you've been exercising regularly during your pregnancy, it's less likely you'll experience any problems in the wild. After the sixteenth week, though, doctors discourage any activity that could result in an injury to the fetus. Falls are more common later in pregnancy because a woman's center of gravity changes and the pregnancy may make movement more awkward. Take special care to avoid falls.

See Chapter 11 for further information on what to do in the case of suspected miscarriage.

BUSHCRAFT TIP

You can drink water treated with iodine for several weeks during your pregnancy, but don't do so during the first few weeks; long-term use of wilderness water sources will require alternative methods of disinfection and purification such as boiling.

TIPS AND TRICKS

- You can return the taste to boiled water by shaking it briskly or sloshing it back and forth between two containers to add new oxygen into the water. This will eliminate the flat taste.
- Glucose liquid or a few hard candies are a great addition to anyone's first-aid kit since they will help diabetics and those of us who get cranky without a little sugar after a hard day's trek.
- Use a powder of white wood ash to help prevent chafing and breakouts of heat rash before a day of hiking.

- When undressing at night, to avoid contact with the oils from poison ivy and other plants (which are surely on your pant legs as well as your boots or hiking shoes), you should remove boots first using gloves if available to unlace them, and then remove pants so that the cuffs do not contact the ankles. Remove socks last. Reverse this order when dressing in the morning if you are wearing the same clothes.

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Chapter 13

ENVIRONMENTAL HAZARDS

“People need to be cautious because anything built by man can be destroyed by Mother Nature.”

—RUSSEL HONORÉ

Even a well-prepared lover of the outdoors can occasionally get sidelined by an environmental injury—that is, a problem related to weather or the hazards of the local environment. As always, prevention is the best medicine but we’ve got you covered for those times when it isn’t enough.

HYPOTHERMIA, FROSTBITE, AND SUBMERSION INCIDENTS

Some of the most common environmental injuries are related to cold weather. Ideally, you and your group should have the perfect clothing for your stay in the great outdoors, but sometimes the weather changes unexpectedly, or your two-hour hike, for which you’re

completely prepared, turns into an eight-hour ordeal involving a black bear and an unexpected dive into a lake.

HYPOTHERMIA

When your core body temperature falls below 95°F you are suffering from hypothermia. Untreated, it can lead to severe injury or death. If your temperature is 90–95°F, you are mildly hypothermic, but you should still address the problem immediately. If your core body temperature falls below 90°F you are severely hypothermic.

The first thing to do is to get into warmer temperatures, either by finding a shelter or building a fire. The environment should be dry rather than wet. Eat a carb-heavy diet and stay covered in dry, warm clothing.

Severely hypothermic people are extremely sensitive to touch. If you're administering to one avoid sudden movements of his body. Watch his breathing carefully; you may have to perform rescue breathing.

If the patient's clothing is wet, remove it carefully. Place him on a blanket on top of at least 4" of compressed material so as to insulate him from the ground and wrap him in blankets or spare clothes. Heat metal canteen bottles and put them around his neck and groin, as well as under his arms. Create a vapor barrier from a drum liner or trash bag and wrap him in this. The barrier will trap heat in his body. Evacuate the patient as soon as possible.

SELF-AID

The first step in self-aid is always prevention, but if you start to become cold, shiver, etc., you can check your current state by attempting to touch your pinky finger to your thumb. If you can still do this then you have gross motor dexterity and now is the time to act. Fire is your friend in these conditions. Building a fire and using the reflectivity of a space blanket will help warm you up. Do not sit directly on the cold ground. It takes 4" of compressed insulative material to combat conduction, so take care of that as well. These activities—building a fire, creating an insulating pad for the ground—will also increase metabolic heat, which in itself will help as a quick treatment. Make sure you

remove and change any wet clothing if possible and also pay attention to a simple acronym (COLDER) when operating in cold environments.

C = Clean: Clothing clogged with dirt cannot breathe properly and will trap heat and moisture causing sweat, which can make you feel colder from convection.

O = Avoid overheating: This causes you to sweat, making you colder from convection more quickly.

L = Dress loose and in layers: This helps you adjust clothing easily to release excess heat or trap needed body heat between layers of clothing.

D = Keep clothing dry: This goes back to sweating, but also you need to be attentive to where you sit or kneel.

E = Evaluate your clothing: Review what you're wearing and make adjustments accordingly.

R = Repair: Mend clothing if needed. Clothing with large holes, tears, etc., cannot perform as designed.

FROSTBITE

Frostbite happens when you're exposed to severe cold. When your skin temperature drops below 59°F, your body dilates the blood vessels to pump warm blood to the skin in surges. This is called cold-induced vasodilation (CIVD). If you grew up in a cold-weather climate, your body has likely developed a stronger CIVD response than other people have, and you may be less susceptible to frostbite.

When skin temperature drops to 37–50°F, your body will start drawing blood away from your skin in order to protect the vital organs of the body. When this happens, your skin temperature, particularly in extremities like fingers and toes, can drop as rapidly as 1°F per minute.

Assessing the Severity of Frostbite

There's a tendency, especially among inexperienced outdoors people, to think that numb equals frostbite. The reality is better than that. If your skin temperature falls to 50°F, you'll lose sensation (in other words, become numb). But you're not frostbitten yet. To find out if you're in the early stages of frostbite, use your thumbnail to push down on the area affected. If the skin dents and stays that way,

you’re heading for frostbite. If you can’t dent the skin at all, the freeze has penetrated deeper than the surface layer of skin.

For sufferers from early frostbite, rewarm your hands gently. If you can’t dent the skin at all, you’ll need medical treatment. The most important thing is to get somewhere warm.

Walking on frozen feet is painful and likely to cause significant damage. For this reason evacuation of the injured person should not rely on him walking if at all possible.

Frostbite Enhancers

Mere cold temperatures sometimes aren’t the only factors in creating frostbite. There are several other possible elements. You or someone in your group is more likely to experience frostbite if various contributing factors exist. These include wind chill (the speed and strength of the wind makes it colder); drinking alcohol (something you should never do when hiking in cold weather); smoking (again, not recommended, since it makes blood vessels constrict); hypothermia; exhaustion; imperfectly fitting boots; and wet skin, since any wetness is going to cool things further.

BUSHCRAFT TIP

Remember the old urban legend about a kid who licked a pump handle and froze his tongue to it? Well, there’s some truth behind that. If you touch very cold metal, your skin may instantly freeze. That’s especially true if you handle a metal fuel container, since petroleum fuels have a lower freezing point. Be smart and always wear gloves in the cold.

Warning Signs of Frostbite

Numbness is your body’s warning sign that your skin temperature is getting too low. If you can’t get in a shelter or near a fire to warm up, try stamping and wiggling your

toes to restore circulation. Put your hands under your armpits or in your pockets. But it can be difficult to rewarm your body once circulation begins to withdraw. Remember the lessons we taught here and in other Bushcraft books about starting a fire under difficult conditions? This is where that training pays off. If you can get them, also keep portable hand warmers in your pack where they're easily accessible.

To treat frostbite, whether in its early or advanced stages:

- Put the affected part, whether hand or foot, in water heated to 104–108°F, which will feel hot but tolerable to the skin. If you cannot tolerate the water, then your patient also cannot, and it will more likely slow-cook the frozen limb rather than aid in recovery.
- If you're the caregiver in this situation, ask the victim to try to move the affected area.
- Warm the hand or foot with heated water for up to thirty minutes or until the skin changes color to red and can be moved and bent.
- When you're finished warming fingers or toes in water, put dressings on them that separate each digit.

Rewarming aims to restore circulation before the tissues are damaged. Tissues need oxygen; without it they can't do their job and they die. So circulation is essential if the patient is going to keep healthy tissues in hands and feet. Properly immersing in water and providing external support by keeping the patient warm, comfortable, and calm is all you can do to ensure circulation returns quickly.

BUSHCRAFT TIP

You may be wondering why we don't recommend a fire as the first step in treating frostbite. The answer is that even though a fire is a good idea, it can't heat the air fast enough to combat tissue damage. Warm water is a more effective immediate solution.

SUBMERSION INCIDENTS

It sometimes happens that a hiker falls through ice and is submerged in cold water for a time. Not only is he cold from the surrounding air, but he is also wet. Combined, these conditions can bring on hypothermia very quickly. Get the person into a warm shelter as quickly as possible and remove his wet clothing. Dry him thoroughly and wrap him in warm dry blankets while setting out his wet clothing to dry. If he has a change of clothing, so much the better. If no fresh clothing is available, a blanket alone is better than wet clothing. Insulative wrap or an emergency blanket are good choices for wrapping the victim, since they'll help his body retain heat. Keep him out of the wind and use a fire with a reflective wall to warm him. Keep a close eye on him to make sure he doesn't develop any other symptoms. Falling through ice can be a very frightening experience. As he recovers, a cup of tea or hot soup is a good idea.

BUSHCRAFT TIP

Chilblains are inflamed areas of skin, usually on the fingers, caused by repeated exposure to the cold, particularly in wet or windy weather. The inflamed skin is red, itchy, and tender. It may blister. Any type of soothing lotion can ease the symptoms. To prevent chilblains, wear gloves. Although chilblains are usually a minor problem, they can sometimes get infected, so keep an eye out for signs of infection (warmth, red streaks, any type of fluid drainage).

PRACTICAL SCENARIO

You and a friend have gone canoeing down the Kentucky River in early March. The weather has started to warm up, with highs in the low 50s, and you both have been looking forward to shaking off your cabin fever. The trip goes off as planned until your buddy decides to get a little overanimated telling a story and lets his paddle go, which results in it floating away quickly. He sees it and scrambles to grab it, tipping the canoe, and you both fall into the cold water. It immediately takes your breath, and you struggle to stay above water; your woolen shirt is becoming heavy and saturated, pulling you down. Your friend was wearing synthetic materials, and he's already made it to shore, so you continue to struggle until your toe touches bottom and you walk up to shore. Your main gear has floated down into an eddy along with your canoe. Your friend is shivering uncontrollably, as are you. Now what?

ANSWER

You instruct him to strip down while you do the same. He's not dressed for the weather, wearing mostly cotton clothes and socks with a thick parka-like jacket. He begins wringing his clothes out. You are wearing wool underclothes, canvas pants, wool socks, and a wool blanket shirt. Since your gear has been lost and you don't have a change of clothing, you wring out your wet clothing and immediately put it back on. Since your clothing is wool, it will retain some of its insulative value even when damp. Your friend, however, is no longer able to manipulate his fingers and cannot unfasten his buttons.

You perform a quick fine-motor skills test and ask him to touch his pinky to his thumb on the same hand, which he's unable to do. Thankfully, you keep a ferrocerium rod in your pocket at all times along with a knife attached to your belt. So, you start a fire within a few minutes. You get your friend next to the fire and begin to heat stones, wrapping them in his wet clothes to aid in drying them out enough for him to put them back on. You feel well enough, so you give him your blanket shirt, which helps him considerably.

His teeth are still chattering, and he's shaking like a leaf, but he's able to speak and barely touch his thumb to his pinky, which is a sign he's improving. As he curls up on the rocky shore, you help him place heated rocks wrapped in his clothing under his armpits and around his core, and he gives a sigh of relief. After about thirty minutes, his clothes are dry enough to put on, and his shivering and chattering has stopped. He's still a little cold but feels much better. You, however, have worked up a sweat trying to care for your patient. Remember, sweat can affect you just as easily when the temperatures are low, so take the time to dry off and cool down before deciding what to do about your canoe and gear.

HYPERTHERMIA, HEAT EXHAUSTION, HEAT STROKE, AND SUNBURN

On the opposite end of the spectrum are the common injuries and illnesses that occur from too much exposure to heat. Prolonged exposure to excessive heat can be just as dangerous as prolonged exposure to excessive cold.

HYPERTHERMIA

The opposite of hypothermia is hyperthermia—the overheating of the body. At 101°F, a person has become hyperthermic. If her temperature stays at 104°F for a length of time, she's in danger of losing her life. When someone is hyperthermic, her skin is hot and dry and she's lost the ability to sweat. Her blood pressure drops and she may show signs of fainting or dizziness.

The first thing is to get out of the sun. If the patient is only mildly hyperthermic, moving her to some shade and loosening her restrictive clothing will help. Keep her hydrated (of course, in the heat, everyone in the party should be focused on hydration). When hyperthermia is extreme and you need to cool her down fast, find a body of water in which to immerse her. Don't expect her to do any swimming on her own. Stand next to her, supporting her. If no body of water is available, put cold metal canteens on her neck and arms.

HEAT EXHAUSTION

Heat exhaustion typically occurs when a person overexerts himself in extreme heat. It can happen anywhere in which the environment is hot and the victim has been engaged in vigorous activity. If someone is suffering from heat exhaustion, you will notice that he seems to be sweating more than usual. As you stop to examine him, he complains of a headache. He appears confused, and his pulse is rapid. He retches violently several times.

The most important symptom of heat exhaustion, and one you must address immediately, is dehydration. Get the patient out of direct sunlight and into a cooler environment. Have him drink as much as possible and if this doesn't result in immediate improvement, give him electrolytes.

HEAT STROKE

If you don't treat heat exhaustion, it will result in a heat stroke, when the victim's core body temperature reaches 106°F. At that temperature cells become damaged, increasing heat production and interfering with circulation, which can hurt internal organs.

- What is referred to as a classic heat stroke (CHS) affects elderly people and those who out of choice or necessity remain in a hot environment. CHS is sometimes called a slow cooker.
- Exertion heat stroke (EHS) happens faster than CHS, sometimes in fifteen minutes. For this reason it's often called the fast cooker, appearing in as little as fifteen minutes; this is typically found in people under physical exertion in extreme heat (hikers, athletes). The symptoms of EHS are similar to those of CHS (heavy sweating), but those suffering from EHS will also have a rapid pulse. If they aren't treated immediately, they will fall into a coma, which can be life-threatening.

BUSHCRAFT TIP

Don't be surprised if, when you go to aid the victim of a heat stroke, he refuses to cooperate and even becomes belligerent. This is because with heat stroke, people become disoriented and begin exhibiting an altered mental status, so the first step is to cool him down, either by immersion in cold water or at least getting him away from the heat.

SUNBURN

The most effective way to prevent sunburn is to stay out of direct sun. This seems like common sense, but even when it's a cloudy day, UV rays penetrate the clouds and still do the same harm. When dressing in the summer, wear long-sleeved summer shirts that aid in wicking away moisture while also covering your skin. Also wear wide-brimmed hats, which will protect your head, neck, and face from burning. Cover exposed skin with water-resistant sunscreen—the water resistance is important if you're hiking or working outdoors, since sweat will otherwise sluice off the sunscreen.

Minor sunburn includes redness and relatively minor irritation and can be treated easily enough with skin lotions

to soothe them, with aloe-based gels providing a great deal of comfort.

More severe burns that lead to you looking like a cooked lobster will blister and peel. These are actually second-degree burns, and they often cover a large portion of your body. This is why you shiver and get cold so easily when you've got them; you're becoming hypothermic. You may also feel nauseated or have a headache. Sunburns like these will exude moisture, which is the reason your clothing sticks to you after a sunburn. This moisture is your body's natural reaction to burns—it sends plasma to the skin's surface to cool it down. See Chapter 5 for more information on how to treat serious (second- or third-degree) sunburns.

This natural reaction can lead to dehydration over time, so it's important to drink plenty of fluids while sunburned. Over-the-counter pain medication is helpful as well as aloe-based products or the plant itself applied liberally to the burned area. See Chapter 16 for more information on using plant medicine to treat sunburns.

For other people, these extended periods in the sun not only lead to severe burning, but they cause what we call sun poisoning. Symptoms of sun poisoning include nausea, fever, headache, and dizziness. Move to shelter and drink plenty of fluids; if vital signs deteriorate, arrange for evacuation.

To treat sunburns of any state, follow this same protocol: take a cool (not cold) bath or apply cool compresses to soothe the swelling. Take ibuprofen, aspirin, or acetaminophen to relieve pain.

ALTITUDE SICKNESS

As altitude increases, barometric (atmospheric) pressure decreases. This means that oxygen molecules are spread

out more. In other words, there's less oxygen at the top of a mountain than at the bottom. If you're not used to high altitudes, you may start to show signs of altitude sickness. This is particularly true when someone who lives at a low elevation ascends rapidly to a high elevation. Her body does not have time to acclimatize to the new conditions and her body can react in dangerous ways.

If you don't give yourself time to rest and acclimate along the way, even a comparatively low elevation of 6,500' can bring on mountain sickness. If you've ever driven from a low altitude up a mountain (for instance, driving Mount Rainier National Park in Washington State) you know that going too fast creates a headache. You're short of breath, and you may feel lightheaded. This last is a symptom of hypoxia and means you're not getting enough oxygen in your body. Exertion also plays a serious factor in the onset of altitude-induced illnesses.

BUSHCRAFT TIP

Amateur climbers who take inadequate precautions can experience a high-altitude cerebral edema (HACE), a condition that can lead to death. Remaining at a high altitude too long if you're not used to it can also lead to the development of AMS.

PREVENTING ALTITUDE-INDUCED ILLNESSES

To prevent altitude-induced illnesses, there is one medication that can help: Diamox. This helps the body begin producing more red blood cells (the body's main method of dealing with high altitude). This medication must be started at least a week beforehand to achieve its full effectiveness.

The most effective method is to allow your body to acclimate over several days. Climb high, sleep low, is the mantra for this. Take a hike up to 10,000', then sleep at 6,000–8,000' that night. Take a hike up to 11,000' the next day and return lower to sleep again. A few days of this and

you will have significantly fewer altitude-related illness issues.

Once on the trail there are a few things you can do to help prevent symptoms from setting in. The first and most important step toward preventing the effects of altitude illness is to drink plenty of water. You will need to urinate more often, and this is the goal since it gives your body more opportunity to expel the excess lactic acid in your system. Slowing your pace will also help since there is less oxygen in the air, and you must reduce your exertion accordingly. Find a pace that works for you.

ACUTE MOUNTAIN SICKNESS

Individuals with acute mountain sickness will display apathy and will have difficulty sleeping. They will complain of headaches and lightheadedness and are likely to lose their appetites. They will be weak and have a poor urine output.

HIGH-ALTITUDE CEREBRAL EDEMA

Individuals with high-altitude cerebral edema will display the same signs and symptoms of AMS, only worse. They'll lose muscle coordination (a very dangerous condition for a mountaineer) and may become unresponsive.

HIGH-ALTITUDE PULMONARY EDEMA

Individuals in the initial stages of a high-altitude pulmonary edema will have a dry, hacking cough and complain of chest pains. Their breathing rate will increase and they will have less energy. As the HAPE progresses, the cough will turn more severe, and they will begin to spit up frothy pink sputum, the product of blood in the lungs. Breathing will become more difficult, and the pulse rate

will increase. They will make a gurgling sound when they breathe.

HOW TO TREAT HIGH-ALTITUDE SICKNESS

To treat a person with a high-altitude illness the first step is to recognize the problem. Going higher will make the problem worse, so you should first stop the ascent and then begin to go back down as quickly as possible. If you can administer oxygen, do so. Keep the patient hydrated and give her food (although she may not want to eat). Keep her in the easiest position to breathe; if she becomes unresponsive, she's going into shock and you need to treat for that (see Chapter 7 for information on how to treat for shock).

LIGHTNING INJURY

You may have seen statistics on how unlikely it is that you'll be struck by lightning. That's true, but those who spend a lot of time in the outdoors run a higher risk than stay-at-homes. If you're standing in the middle of an open field during a thunderstorm, you're the most conspicuous object, and you may attract a lightning strike. Water is a conductor of electricity, so it's wise to avoid it in conditions that might produce lightning. The same is true of fence wires. Lightning can jump from one object to another (such as a tree). It can even move through the ground.

The most immediate damage lightning will do to someone is rupture the ear drums. This happens in about half the recorded cases of lightning injuries. Burns, surprisingly, are rarely severe, but your muscles, being subject to a powerful electrical charge, will probably spasm.

To treat someone who has been struck by lightning (or whom you suspect has been struck by lightning) ensure the

scene is safe before attempting to give treatment. Move injured individuals to a safer place if necessary. It's possible that several people have been struck by the same bolt. Look after the quiet ones first, since those making noise are apt to have more superficial injuries. Administer rescue breathing to the victim (or victims) until the pulse rate comes down. If no vital signs are detectable, administer CPR. Take into account when doing your examination that the victim's eardrums have possibly ruptured, and he can't hear your questions. You may have to communicate through signs.

Burns and any other injuries should be treated as you would in other circumstances.

FOOD POISONING

Out in the wilderness it can be more difficult to adhere to food safety principles. Sometimes a person will eat something that has been improperly stored or cross-contaminated, and the result can range from a mildly upset stomach to a life-threatening illness.

Carrying unrefrigerated meat for several hours while you travel allows harmful microorganisms in the meat to multiply. While cooking it to well-done can destroy many of those germs, returning the cooked meat to the surface that contains the drippings—and the germs from the raw meat—can then contaminate the cooked meat. This is just one example that most campers, novice and advanced alike, are guilty of. It can and often does lead to illness, but it can all be avoided by implementing the following tips:

- Wash your hands frequently when handling food, especially after handling raw meat. When soap is not available, potable water alone is better than nothing.

Consider using wood ash as a disinfectant. It can easily be rinsed off.

- Insulated thermal containers and coolers keep food hot or cold for many hours. Pack coolers so that meat drippings do not contact other food. Keep coolers wrapped with towels or blankets to increase their ability to keep items cold or hot and keep them hidden from direct sunlight.
- Preservative-rich foods such as salt-cured meats, processed lunchmeats, and hot dogs are slow to spoil and retard the growth of harmful microorganisms.
- The best way to transport raw meat for long distances is to start out with it frozen solid. Ground meat will thaw faster and is more perishable than solid pieces and therefore should be the first item cooked. Cook meat thoroughly to the center (medium-well to well-done). Place cooked pieces on clean surfaces. Wash utensils after using on raw and cooked items, and eat the meat while it's still hot.
- Charcoal is your friend—should you become ill after ingesting food, crush some charcoal into a fine powder, add it to water, and consume the mixture. It will aid in arresting microorganisms and bacteria in your digestive system, which will make you feel much better.

EYE INJURIES

Eye injuries are not uncommon in the outdoors. When you're hiking up a trail, you might be watching your footing and not notice the tree limb until it slaps you in the face, injuring your eye. Or, you might be warming yourself by standing close to the fire and a spark finds its way into your eye. When hiking with others, use trail etiquette by holding limbs and other potential sources of injury out of fellow travelers' path. Consider wearing safety glasses or even

dust goggles while trekking through thick brush if you don’t have sunglasses or do not wear prescription lenses. Protective eyewear, while not always fashionable, certainly beats a stick in the eye. Debris from fires, dust, and trees can all factor into eye injuries as well—little bits of bark or dust from the fire under the eyelid can drive you nearly mad while also scratching the cornea. There are three types of eye injuries common to wilderness travel:

DEBRIS UNDER THE EYELID

When debris is under the eyelid, it scratches the surface of the eye and is very irritating, leading to itching, redness, swelling, and a plethora of tears. To treat, first clean your hands before attempting to flush the eye with clean, potable water that is lukewarm or near body temperature. If something is really stuck under the eyelid, fight the urge to rub it, thereby potentially grinding it into the eye. Instead, ask someone to lift the eyelid to locate it (it may be attached to the eyelid, so if you’re treating someone else, look carefully and have the affected person look in all four directions, as it sometimes moves with the eye). Roll a piece of gauze or soft cotton and dampen it, then place it under the person’s eyelid and drag it toward you to scrape out the debris. Should that not work, pad the eye and tape it closed, and evacuate the injured person for medical care.

CONJUNCTIVITIS (PINKEYE)

Pinkeye is an inflammation or infection of the transparent membrane (conjunctiva) that lines your eyelid and covers the white part of your eyeball. It can be caused by allergies or a bacterial or viral infection. Pinkeye can be extremely contagious and is spread by contact with eye secretions from someone who is infected. Symptoms include redness, itching, and tearing of the eyes. It can also

lead to discharge or crusting around the eyes. Generally it will clear on its own within two weeks.

Allergen-induced pinkeye can be treated with antihistamines such as diphenhydramine (Benadryl) but bacterial infections require antibiotic drops. Avoid getting it by washing your face with potable water, and do not open your eyes underwater while in the field. Unclean water, rich with fecal bacteria, is a leading reason why this ailment is contracted in the wild. It's a good idea to rinse your eyes with eye drops after spending time in a particularly dust-ridden area or taking a swim in a questionable water source.

PENETRATING EYE INJURY

A penetrating eye injury is when the eye itself has been penetrated by being lacerated or impaled by an object. It's a very serious injury requiring immediate evacuation. If lacerated, control the bleeding and heavily pad the injured eye. You may instruct the injured person to close both eyes, which will limit movement of the injured eye, but this also means first-aiders will be responsible for evacuating him since he'll be unable to walk out on his own.

Should the eye be impaled, do not remove the impaled object, and instruct the injured person to resist the urge to remove it. Control the bleeding, pad the object to inhibit movement by rolling gauze pads, socks, T-shirts, or any other cotton material available, and tape it into position. Once the object is secured, consider the object's length. If it's too long to allow for safe evacuation, you may have to shorten the object. Avoid, if at all possible, sawing motions when shortening and, again, only shorten if absolutely necessary. Again, the injured person should close both eyes so the injured eye is not forced to track with the open eye. Evacuate to medical care as quickly and safely as possible.

TREATING DEHYDRATION

You may have a mental picture of sitting by a crystal-blue lake, sipping a cup of water you've just drawn from it as you gaze at the herd of deer drinking a dozen yards away. That's a nice picture, but get rid of it. In fact, fresh water is often contaminated.

Biological pathogens are the main water concerns if you're traveling in the United States and Canada. You can use a water filter to get rid of protozoan cysts (such as *Cryptosporidium parvum* and *Giardia lamblia*) and bacteria (such as *E. coli*, *Salmonella*, *Campylobacter*, and *Shigella*).

Water purifiers go a step further by also combating viruses (such as hepatitis A, rotavirus, and norovirus) by the addition of chemicals such as chlorine or iodine, or UV light. If you're traveling in less-developed areas of the world, consider using a water purifier rather than relying on a water filter alone.

Prefiltering is another important thing to consider. If you're gathering water that is cloudy or silty, UV light purifiers and ceramic-style filters will not work as effectively, and the water may require multiple treatments. Boiling water remains the most low-cost and effective means of making water potable. At elevations under 10,000', bringing water to a rolling boil (boiling about one minute) is all that's required. In elevations above 10,000', add one minute of boil time for every 1,000' of elevation, not to exceed twenty minutes. So at 14,000', you would boil for four to five minutes. Boiling the water and using a UV light or iodine will eliminate all potential contaminants, but this is overkill for much of the United States and Canada; you can generally get by with one or the other without issue unless you're in a chemically contaminated area such as an industrial or agricultural runoff zone.

Straw filters (plastic pipe filters meant for one person to use) provide a lightweight, quick way to get water into your

system, but only in small quantities. While this is fine when you're on the move, it's not good for a base camp or when you're camping over multiple days. Also, when it's cold, straw filters can shatter if dropped or freeze up altogether if not properly cared for.

The key to remaining hydrated is to begin your trip fully hydrated. On your way to your destination, you should be drinking water every fifteen minutes or so until you get there. You should have already devised your water plan for the trip beforehand, so if you're going to carry in 2 quarts of water (about 4 pounds) and rely on nature to provide the rest, have the appropriate gear to get water fast (such as a straw) and in large amounts (such as a gravity filter) for when you're in camp.

Multiple containers such as stainless steel bush pots make boiling several servings of water at one time a cinch. But don't wait until you're dehydrated and thirsty to begin boiling; it's already too late and you're likely not going to catch up and rehydrate properly unless you spend a full day in one location boiling water in larger amounts (10 cups at a time). It's not the boiling that's difficult, but the cooling—it takes water longer to cool than it does to bring it to a boil—so consider placing the boiled container in a cooling puddle at the side of your water source. This will help speed the cooling process and aid in getting water into your body faster.

Remember that overhydration is also dangerous as it can lead to hyponatremia. With this condition, the body holds on to too much water. This dilutes the amount of sodium in the blood and causes levels to be low. Symptoms include nausea, headache, confusion, and fatigue. So if you're taking the time to rehydrate, but hit a point at which you begin forcing water into your system and start feeling tired and nauseous, ease off. Limit your fluid intake and rest. Hospitalization may be needed in advanced cases.

TIPS AND TRICKS

- Plants that provide mucilage (slimy texture) such as violets and mullein will aid in soothing a sunburn when applied topically.
- A cup can be placed over an object impaling an eye to serve as a protective covering for the eye and a brace for the impaled object.
- Space blankets with reflective side up can provide good shade from the sun.
- Cotton is not the best wear for cold-weather environments, but to take advantage of evaporative cooling in the summer, there is nothing better than a cotton T-shirt.

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Chapter 14

INSECT AND ANIMAL BITES

"In my life outdoors, I've observed that animals of almost any variety will stand in a windy place rather than in a protected, windless area infested with biting insects. They would rather be annoyed by the wind than bitten."

—TIM CAHILL

What's a camping trip without a few chigger bites? While most encounters with insects are more annoyance than injury, sometimes you will need to treat an insect bite (or at least soothe the sting). As unlikely as it may seem, insect stings can be more dangerous to you than animal bites!

PREVENTING INSECT BITES

You may never be able to completely foil the chiggers, but you can take some steps to reduce the likelihood of insect bites and stings. For example, be aware of where you are walking, sitting, standing, and sleeping. You don't want to make your bed over a fire ant colony.

APPROPRIATE CLOTHING

Clothing is your first line of defense against the elements, including insects, and is considered one of the Ten Cs—a cover element. Therefore it is also part of your shelter considerations. Appropriate clothing for wilderness travel will vary slightly with the changing seasons but will always include a base layer and middle layer (which may serve as an outer layer in warmer months) and in cooler months, an outer layer or shell as well.

SELF-AID

Long-sleeved shirts and long pants, even in summer months, will help protect you from insect bites. Tuck pant legs inside boots and then use duct tape for garters. This will help keep ticks from the legs. Mosquito netting can be placed around the head and face and can double as a minnow net for fishing. Many plants have a natural bug repellent factor. These include most with a volatile oil, such as birch. Many plants like yarrow can be rubbed on the skin as a raw plant and will do some good as well. One of the best things is a clay-based mud smeared on any exposed parts of the body.

BATTLING INSECTS

We need to distinguish between insect repellents and insecticides. Repellents are substances we put on our skin. An insecticide can’t be put on your skin; it’s for use on other materials (clothing, tent walls, etc.).

While the most widely used repellent is DEET, be careful! Using it in too high of concentrations on your skin can bring on an allergic reaction. Be cautious of using it on small children. These days a number of repellents are manufactured specifically for kids. Keep the repellent away from your lips, eyes, and any cuts or scrapes you have.

In the battle against ticks, chiggers, fleas, sand flies, and mosquitoes, the best insecticide to use is permethrin. Never put it on your skin; use it only for clothing, tents, sleeping nets, or shoes. Since it retains its power for weeks and even months, you probably won’t have to apply it more than once or twice a season. As well, it won’t stain or injure

the fabric. Put DEET on your skin and permethrin on your clothes and tent and you're likely to avoid the problem of insects.

IDENTIFYING AND TREATING SPIDER BITES

Spiders may creep a lot of people out, but the vast majority aren't dangerous. Some are venomous, and a very few are dangerous to humans. Most spider bites aren't a cause of concern. A few spiders do have fangs long enough to pierce human skin and venom toxic enough to make humans sick. These include the black widow, tarantula, and brown recluse spiders. It's extremely rare to die from a spider bite in North America but the venom can make you sick enough to warrant professional medical attention.

When you're bitten by a spider, you'll probably feel a sharp prick followed by a red mark where you felt the pain. If the spider is venomous, the bitten person may experience muscle stiffness and cramps in the bitten limb. These may gradually start to affect other areas of the body such as the abdomen and chest as the venom progresses through the body. As time passes, other symptoms manifest themselves:

- Aching and itching
- Fever
- Heavy sweating
- Headache
- Weakness
- Vomiting
- Joint pain
- Rash
- Severe abdominal pain

If someone in your party has suffered a bite and begins to show these symptoms, clean the bite, using soap and

clean water. Then put cold packs on the bite; this will help ease the pain. If you don’t have over-the-counter medication to address the situation, look for tulip poplars and make a poultice from the leaves. You can also do this with plantain or black walnut leaves. If the bitten person is showing signs of poisoning, check her airway regularly and begin preparations for evacuation. Doctors will administer an antidote to the bite and will almost always do this to children and elderly people. Try to find the body of the spider that administered the bite, although this will probably be difficult. The body will help doctors determine what kind of spider bite they’re treating.

THE BLACK WIDOW

The black widow is one of the most widely known of poisonous spiders, although relatively few people have seen them in the wild. They’re found throughout the world, but humans are only affected by the bite of the female. Females have a red spot on their abdomens; it’s shaped rather like an hourglass. See Figure 14.1.

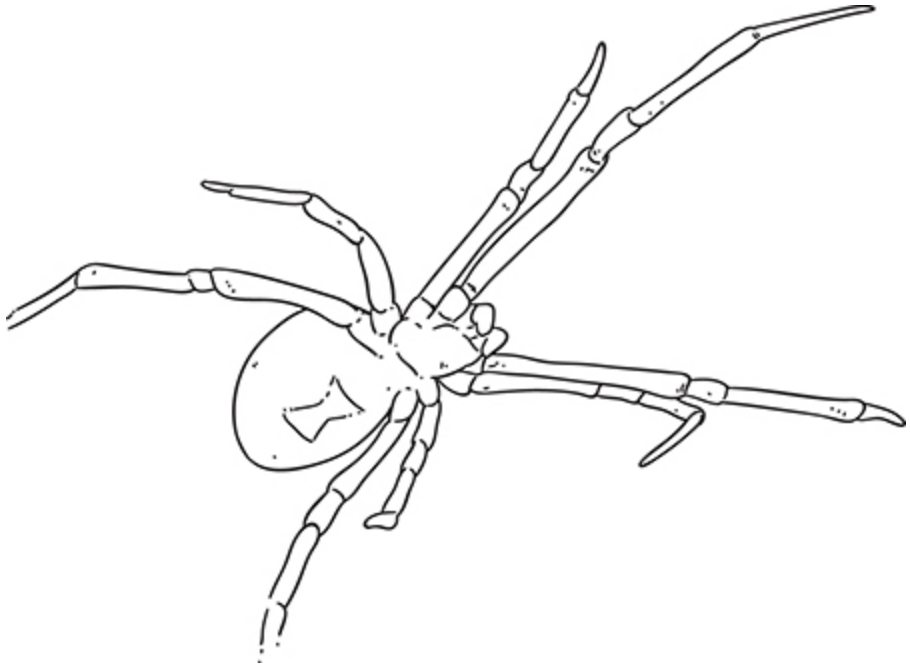

Figure 14.1. Black widow spider

BROWN RECLUSE SPIDER AND HOBO SPIDER

The brown recluse has a uniform body color (ranging from cream to dark brown). Its back has a purplish-shaped marking that looks a bit like a violin. This gives it its popular name: fiddle-back. While they are most common in the southern and central regions of the United States, they're also found in northern areas. Similar to the brown recluse is the hobo spider, found in Europe and Asia as well as the United States and Canada. It has no markings, and even though its bite is poisonous, there is a lot of debate in the scientific community about how dangerous it really is. If nothing else, the bite is very painful. See Figure 14.2.

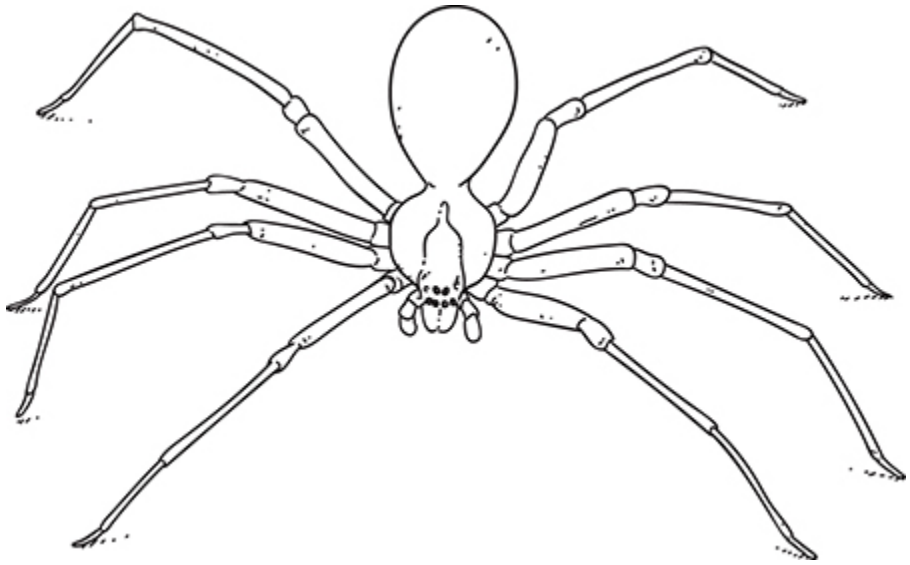

Figure 14.2. Brown recluse spider

TARANTULAS

When we think of big hairy spiders, we're probably thinking of tarantulas. They have distinctively hairy bodies and legs and can range in length from about 4.5" to 11". Though their bite is painful, the venom is weaker than the venom a bee carries in its stinger, so it is unlikely to cause any problems unless you happen to be particularly allergic to them. You are more likely to have a complication because the bite itself hasn't been properly cleaned than because of the venom. See Figure 14.3.

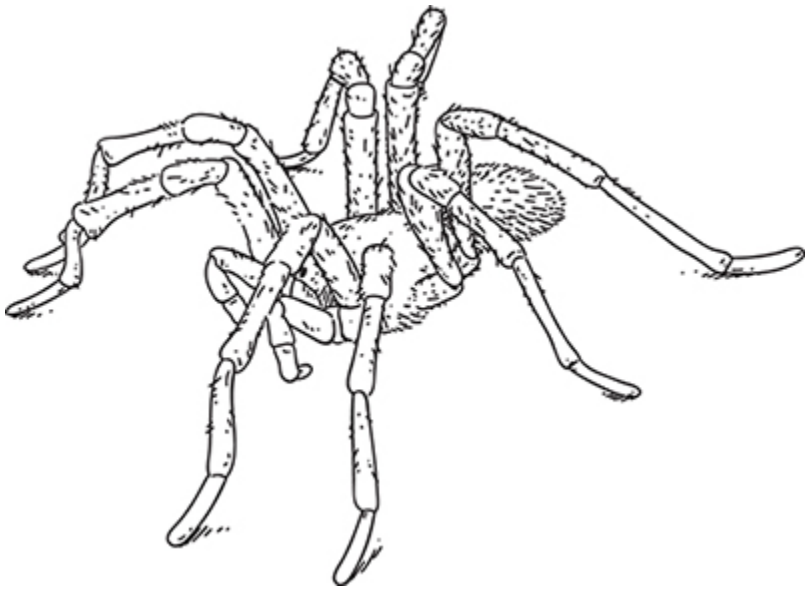

Figure 14.3. Tarantula

IDENTIFYING AND TREATING TICK BITES AND TICK-BORNE ILLNESS

The danger of tick bites is that they're painless. This may sound like an odd thing to say, but the real danger is that if a tick bites you and attaches itself to you, you can carry it for days before you're aware of it. Since ticks are potential disease carriers, this is serious. This is why it's important to do frequent visual inspections when you're out in the wilderness. Be sure to pay special attention to areas prone to tick bites, such as the ankles and neck.

While most ticks are harmless, some carry Lyme disease (LD) and Rocky Mountain spotted fever. A few can cause tick paralysis. The best defense against tick bites is not to let them land on you. Ticks are heaviest in clearings near woodlands—such as trails, paths, and open areas that are frequented by larger animals, so pay special attention when traveling in these areas. Wear clothing suitable for keeping ticks off: long-sleeved shirt, long pants, hat. Consider using a combination of pesticide and insecticide as described in the "Battling Insects" section earlier in this chapter.

If these measures fail, the next step is to remove any ticks before they have time to infect you—thus the importance of the daily skin check. The longer a tick remains attached, the greater the likelihood that you'll develop an infection. Ticks can be difficult to remove once they've attached themselves to your skin. Make sure you've removed the entire tick. Sometimes the body pulls away, but the head remains, which can still cause an infection.

REMOVING A TICK

To remove a tick, use tweezers to grasp the tick as close to the skin surface as possible. Pull it out of the skin using a steady motion and even pressure. If the body detaches, leaving the head buried in the skin, remove the head with a needle or some other sharp instrument, since the head can still cause infection. If you don't have tweezers available, use your fingernails but be sure to protect your hands with gloves (remember the importance of body substance isolation).

Once the tick is removed, wash the bite with soap and water. Use cold packs or a cold canteen to help reduce swelling and to relieve pain. The signs of infection from a tick bite may take a while to appear—as much as a month from the time of the bite. If you develop a severe headache or fever, see your doctor immediately.

BUSHCRAFT TIP

Ticks have a four-stage life cycle: egg, larva, nymph, and adult. Eggs hatch into larvae, larvae become nymphs, and nymphs grow into adults. After they hatch, ticks require blood to survive at every stage of development.

Lyme disease, one of the fastest-growing infectious diseases in the United States, is a bacterial infection that is passed on to humans by the bite of a tick. It's most commonly carried by the deer tick. The nymph of the deer

tick is the most prevalent carrier. Because it’s only the size of the period at the end of this sentence, it is difficult to see. See Figure 14.4.

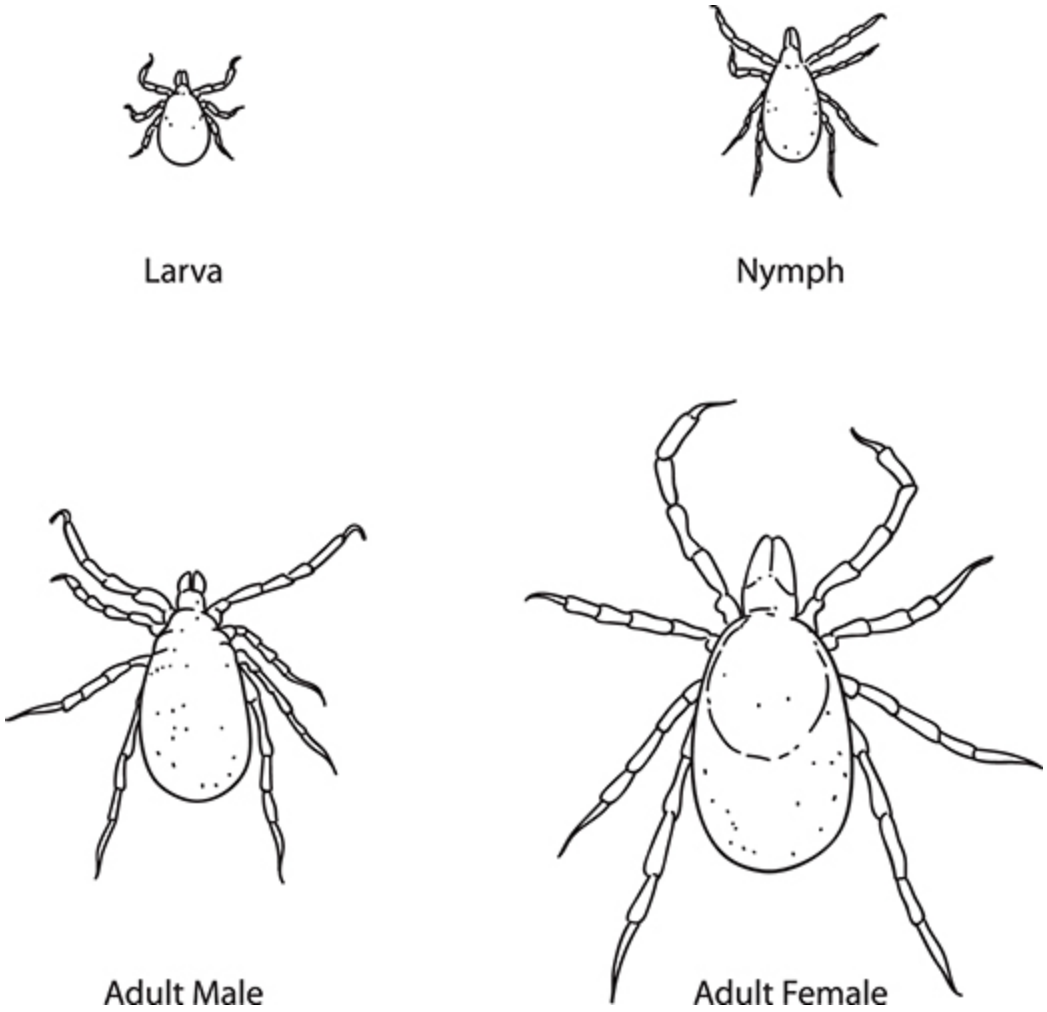

Figure 14.4. Deer tick

LYME DISEASE

Lyme disease–infected ticks are prevalent all over the United States but are more commonly found in the Northeast and Upper Midwest.

Symptoms can take several weeks to develop and people often don’t make the connection between the onset of the illness and the tick they removed weeks ago. The early symptoms of Lyme disease are similar to the flu—fever,

chills, muscle aches, and nausea. Joint pain is also common. If not treated, inflammation from the disease can spread to the nervous system and other organs. Sometimes (though rarely) the damage is permanent.

If caught early enough, Lyme disease can be treated with antibiotics and won't cause lasting damage. Treatment is usually effective in stopping the progress of the disease even if it isn't diagnosed immediately, but some people may experience symptoms for months or years after treatment.

ROCKY MOUNTAIN SPOTTED FEVER

Like Lyme disease, Rocky Mountain spotted fever is a bacterial illness that people contract from infected ticks. And like Lyme disease, the symptoms can take a while to present themselves, in this case from about two to fourteen days after the bite. Symptoms include fever, muscle aches, abdominal pain, vomiting, and headache. Sometimes a rash occurs a few days after other symptoms begin.

Ticks infected with the Rocky Mountain spotted fever bacteria can be found throughout North America but are especially common in the southeastern United States.

As with Lyme disease, early treatment (within the first few days of symptoms) with antibiotics usually results in a cure. Because Rocky Mountain spotted fever can be quite serious and is potentially fatal, if you experience any flu-like symptoms after a tick bite, be sure to seek immediate medical attention.

IDENTIFYING AND TREATING INSECT STINGS AND INSECT-BORNE ILLNESS

Although people are more afraid of snakebites than bee stings, they're actually more likely to die of a bee (or hornet or wasp) sting than a snakebite. Some people are so allergic to stinging insect venom that a single sting can be

fatal (anaphylaxis, which is discussed in Chapter 12). It's possible to develop an allergy at any time in life even without a previous history, and multiple stings can be fatal even if a person is not allergic to the venom.

People are most commonly stung by honeybees, yellow jackets, wasps, and fire ants, so take care to build camps in areas free of these insects. Become familiar with their habitats. For example, fire ants tend to build their characteristic colony mounds in open areas. Honeybees prefer living near wildflowers and will build their hives in trees nearby. Wasps make hives in trees, shrubs, and on the outside of buildings.

PRACTICAL SCENARIO

You're on the trail in a wooded area with some hiker friends when you feel a sting at your neck. You slap at it but whatever bit you is gone. At first you assume it's just a mosquito bite but the sting gets worse as you continue to walk—way more pain than a mosquito would cause. Now what?

ANSWER

You ask one of your hiking buddies to take a look at the site of the bite. When he does so, he notices a stinger in the bite site. No one has a pair of tweezers along but you have a sail needle in your backpack, and he uses that to scrape out the stinger. You don't have any history of allergies to bee stings. Once it's out, you feel some relief, although the site of the bite is still sore. You clean the bite with soap and clean water, then hold a cold compress against it for about fifteen minutes, and that helps with the pain. Your buddy keeps an eye on you for the next hour to make sure you don't develop an allergic reaction.

People can usually tell when they've been stung by a stinging insect. To treat a sting, first remove the embedded stinger (if there is one), then wash the site of the bite with soap and water. To reduce swelling and pain, apply ice or a cold canteen to the bite for fifteen minutes or so. If the bite itches or causes pain, over-the-counter pain relievers and antihistamines can help provide relief. Keep an eye on the patient for at least one hour after the bite. If he shows signs of a serious allergic reaction, such as hives, redness,

swelling all over the body, or difficulty breathing, administer epinephrine immediately if available. In any case, maintain the airway and evacuate immediately.

SNAKES AND SNAKEBITES

Poisonous snakes are the staple of fiction and nightmares. However, of the vast number of snake types in the United States, only two families are poisonous: pit vipers and coral snakes.

Pit vipers, which include copperheads, rattlesnakes, and water moccasins, have a triangular, flat head, wider than the neck; vertical elliptical pupils; and a heat-sensitive “pit” located between the eye and nostril. They can range in size from 1–12', but on average they tend to be 3–4' long.

The coral snake, on the other hand, is small. Its name derives from the colorful bands of bright red, yellow, and black that encircle its body. The red banding is bordered by yellow banding against black. The coloring is similar, but not the same, to the nonvenomous king snake, which has red and black bands. When in doubt, remember the rhyme, “Red on yellow, kill a fellow; red on black, venom lack.” Coral snakes are far less likely than pit vipers to bite and unlike pit vipers tend not to strike repeatedly.

A quarter of the time when a venomous snake bites someone, it doesn’t inject any venom. The bite is painful, but there’s no poison in the system.

SYMPTOMS OF SNAKEBITE

The symptoms of snakebite include pain or burning sensation where the bite occurred. Looking closely, you’ll see two puncture wounds where the fangs broke the skin. Within a few minutes the area will start to swell, and the skin will discolor. The area around it will show signs of blistering, and the victim may feel nauseous and start to

vomit. If the bite is not treated, this can escalate to bleeding. Eventually the victim will slip into a coma and may die.

TREATING SNAKEBITE

The most important aspect of treating a snake bite is to attempt to get as much of the poison out of the victim's body as possible. Suction the bite with a Sawyer Extractor if you're carrying one (a wise choice for your pack if you're traveling in an area where snakes are prevalent); if not, don't try to use other means of suction. If the symptoms are escalating, you need to get the victim out of the wild and to a medical professional as soon as possible. However, evacuation should be done by moving the victim as little as possible, since activity will help spread the poison throughout the body.

A doctor will treat the bite with antivenin, but this must be administered within four to six hours of the victim being bitten, so time is important here. You can put the bitten arm or leg in a sling to immobilize it and walk the person out.

Monitor a bite victim closely. If no symptoms appear after six or eight hours, he's been fortunate to have been "dry bitten" with no venom in his body. On returning home, he should get a tetanus shot.

There are some definite *don't*s when it comes to treating a snakebite. One of the biggest concerns is the popular myth about sucking the poison from the bite with your mouth. Don't do it. Don't put a tourniquet on the bitten limb, either. It's unlikely to stop the poison from spreading, and it could do further damage. The skin around the bite is in a very delicate condition, so don't treat it with ice packs. And don't let the victim drink alcohol or take aspirin, both of which thin the blood, which will make it easier for the poison to spread throughout the body.

ANIMAL BITES

Most of the time in the wild, you won't get near enough to animals for them to bite you. However, you should know the treatment for animal bites on those rare occasions when it happens. (This treatment applies to domestic animals as well, of course, so the next time your dog or cat nips you, you'll know what to do about it.) Animal teeth will leave tears and punctures in your skin. Although the bite itself may not be dangerous, if it's not treated properly it can become problematic. Clean, dress, and bandage the wound and monitor it carefully for any signs of infection.

RABIES

The biggest danger from the bite of a wild animal is rabies, a serious brain infection. However, you can take some comfort from the fact that North America is at a low risk for rabies, according to the Wilderness Medical Society. According to the Centers for Disease Control, only one to three cases of human rabies are reported each year in the United States. Despite the unlikelihood that you will contract rabies in North America, consider the possibility if you're bitten by a dog, cat, skunk, raccoon, or fox and the attack has been unprovoked. As well, you may be at risk if you're bitten by a bat or a large carnivore. Rabies can also enter your body through open wounds, if a rabid animal licks it.

Any sort of bite in the wild should be treated seriously, and the victim should be evacuated so that she can be given anti-rabies serum as soon as possible.

TREATING ANIMAL BITES

To treat an animal bite victim, wash the bite vigorously with soap and water, use an antiseptic on it, dress and bandage the wound, and seek immediate medical care,

noting the animal that gave the injury. If the animal is dead, bring it with you so its brain can be examined for signs of rabies. If it’s not dead, try to capture or kill it.

TIPS AND TRICKS

- Many snakes emit a cucumber-like smell when touched or disturbed, so if you smell this odor in an odd location, keep a watchful eye.
- Do not make a habit of reaching for rock ledge handholds while climbing in warm weather as snakes choose these areas often for shade.
- When stepping over logs be sure to look on the opposite side before stepping to ensure a snake is not present.
- Black widows love woodpiles and dead logs, so when harvesting from these locations for resources wear gloves to help avoid any issues.
- An immediate spit poultice of plantain is never a bad idea for any type of bite.

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Chapter 15

POISONOUS PLANTS

“Poison is in everything, and no thing is without poison. The dosage makes it either a poison or a remedy.”

—PARACELSUS

Though you probably won’t suffer any long-lasting effects from a close encounter with poison ivy, the immediate symptoms of pain and itching can make it impossible for you to enjoy your time in the great outdoors. In this chapter, we’ll look at plants that are poisonous to touch. Chapter 16 offers precautions so that you don’t accidentally eat a poisonous plant.

As with all wilderness injuries, prevention is the best medicine, so learn to identify potentially harmful plants before you engage in outdoor activity, especially in overgrown areas. Wear gloves and long sleeves, do not make contact with your face or eyes with gloved hands, and do not wipe your face on your sleeve. Carry a solvent such as alcohol sanitizer, which will cut the plant oils that induce a contact dermatitis.

Don’t forget about what happens at night. When you’ve tracked through poisonous plants all day long and then reach down to get undressed for the evening, guess what

you are doing? Spreading the poisonous plant oils to anything you touch. Here are some things to think about:

- Always remove boots first with your gloves on (if you are highly allergic).
- Wear slip-on boots instead of laces if you can.
- Next remove your pants, not your socks, as removing the socks will rub the cuff of the pants against the skin, again spreading the oils.
- Socks come off last and go on first in the morning.

PLANT-RELATED SKIN CONDITIONS

Many people—about 70 percent of those in the United States—have a sensitivity or allergy to a compound called urushiol present in the resin of certain plants. After touching (or brushing against) plants such as poison ivy, susceptible people develop contact dermatitis, which is an inflammation of the skin that causes redness, itchiness, and blisters. While contact dermatitis is not dangerous, it can be painful and the itching can be extremely uncomfortable. If scratching the itches leads to breaks in the skin, it is possible to get an infection.

The most common cause of contact dermatitis in the United States is just three plants: poison ivy, along with poison oak and poison sumac. You can encounter poison ivy almost everywhere in the United States except Alaska, California, and Hawaii. Poison oak is much less common and is more likely to be found on the coasts (the West Coast more so than the East Coast). Poison sumac is generally found in the southeastern United States.

BUSHCRAFT TIP

Though the blisters that form after contact with a poisonous plant are filled with fluid, this fluid does not contain the allergen itself and doesn't cause the allergic reaction to spread. Contact dermatitis itself isn't contagious and you can't spread it to other

people. It's the *resin* from the plant that contains the allergen and causes the reaction to spread. Since the resin is sticky, it tends to remain attached to surfaces (including skin and clothing) and can easily spread to other surfaces (and other people) you might touch after exposure, such as clothing, bedding, and even your pet. Wash your skin and any clothing you were wearing and be sure to clean any surface that may have come in contact with the resin.

RECOGNIZING POISONOUS PLANTS

Here's a brief introduction to identifying poisonous plants and treating their poisons.

POISON IVY

You may remember the old saying, "Leaves of three, let it be." That's still excellent advice. Poison ivy plants usually have clusters of three broad leaves shaped like spoons. Once you know what it looks like, it's easy to spot—and you'll spot it everywhere. Poison ivy can be a vine or a shrub; the vine can grow low to the ground or it can climb on fences or trees, so you have to keep an eye out for it constantly. See Figures 15.1, 15.2, and 15.3.

Figure 15.1. Poison ivy

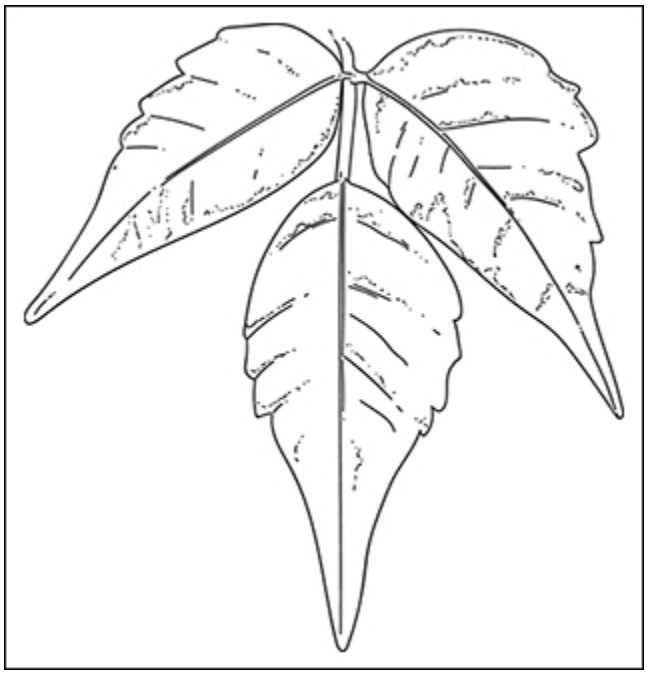

Figure 15.2. New leaflets are shiny and pointed

Figure 15.3. Reddish rootlets anchor poison ivy vines to the tree’s bark

POISON OAK

Poison oak gets its name because its leaves look like oak leaves—slender leaves with scalloped edges. The leaves grow in odd-numbered groups of three, five, or sometimes

seven. In the spring it produces yellow-green flowers that become berries of a similar color in the summer. Like poison ivy, it can grow as a vine or a shrub. See Figures 15.4 and 15.5.

Figure 15.4. Poison oak leaves

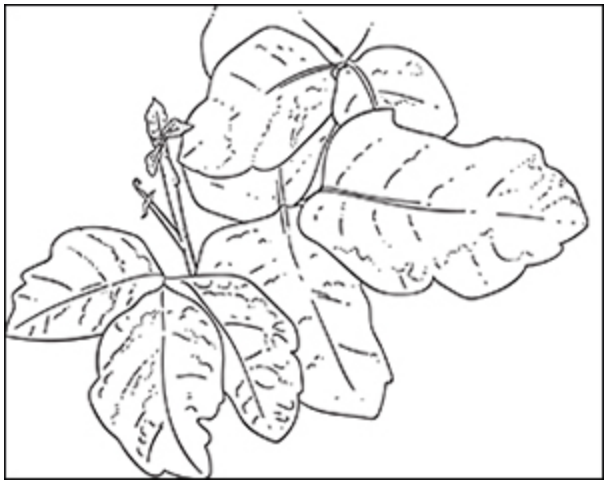

Figure 15.5. Young poison oak

POISON SUMAC

Poison sumac can be a tree or a shrub, and can grow quite tall—20' or more. Typically the foliage is not very

dense. As a small plant, the leaves grow upward but the branches sag down as the plant reaches full height.

Leaves grow in parallel pairs up the stem with a single leaf at the end of each stem. Stems can be red, brown, or gray, depending on the age of the plant. The leaves have an oval shape that comes to a point at the ends. As with any deciduous plant, the leaves change color as the seasons change. See Figures 15.6, 15.7, and 15.8.

Figure 15.6. Poison sumac

Figure 15.7. Poison sumac

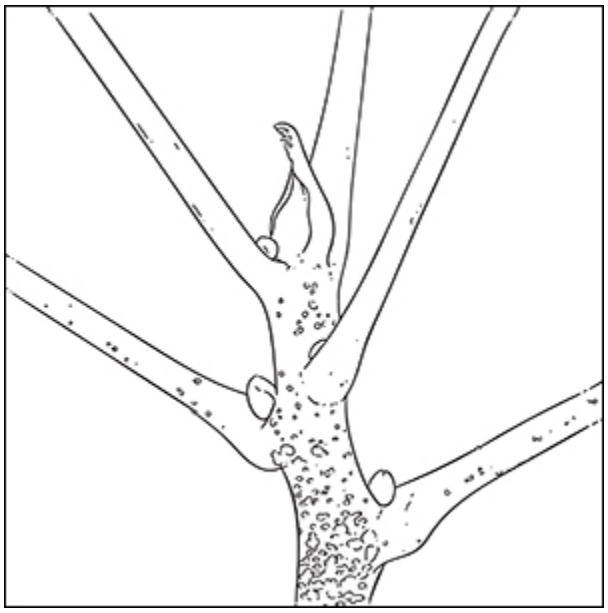

Figure 15.8. Stem of the poison sumac

TREATING REACTIONS TO POISON IVY, POISON OAK, AND POISON SUMAC

If you touch any of these plants, their resins will begin to bond to your skin. The process takes about half an hour, so if it's been more than thirty minutes since you made contact with the plant, it will take more than soap and water to remove. So it's important to wash your skin immediately after exposure and to remove and wash any of your clothing that came in contact with the resin as well (being careful not to touch the surface with your bare skin).

If you are not able to immediately remove the resin, use an alcohol-based cleaner or a commercial preparation (Poison Oak-n-Ivy skin cleanser, for example). To treat:

- Wash hands and infected surfaces immediately with soap and plenty of water. Isopropyl alcohol (in hand sanitizers) works great for neutralizing the resin as well.
- Apply calamine lotion if available.

- Burleigh Balm and Fix'n Wax also work to slow spread and itching if applied regularly.
- Jewelweed and plantain also aid in the prevention of spread, redness, itching, and swelling.

SELF-AID

If you're suffering from an itch because you got too close to a pile of poison ivy, any plant or tree with a high concentration of tannins will constrict the pores of your skin and help push the oils to the surface where they can be neutralized more easily or scrubbed off. Oaks, both red and white, have high concentrations of tannins even in the leaves. You can create a cold infusion or a tea that will help as a wash. However, do not use warm liquid on an itch as this will only serve to aggravate the condition.

PRACTICAL SCENARIO

You're out clearing shooting lanes for the upcoming deer season. It's hot out and you're reduced to using a pruning saw since your chainsaw has been giving you fits. You're sweating profusely, but are well hydrated, so you keep about your business. You spot some poison ivy, which you're allergic to, on the tree you're cutting and make every effort to work around it. A limb you cut off falls harmlessly to the ground but brushes your face and arm on its descent. You continue for the next couple of hours until you're finished at which point you notice that your arm is pink and slightly swollen in a small spot and your face has a slight tingle, although not an itch yet. Now what?

ANSWER

You are quick to realize the branch that brushed your face earlier may have had some ivy on it that you didn't see. Under normal conditions, a simple brush may not have affected you, but because the pores of your skin were opened due to the heat and excessive perspiration, they more readily absorbed the oil from the plant.

You go home and wash your face and hands with Dawn dish soap (which helps dilute the oils), then jump into the shower (which opens your pores). You get clean and feel better, but now you have a pronounced itch and swelling on your face with bumps appearing on your arm. You apply some poison ivy cream, which alleviates the itch, and take an antihistamine to boot, but it's too late—you got poison ivy that easily and just have to ride it out.

TIPS AND TRICKS

- Lye soaps are very good on cases of contact dermatitis such as this as they are drying to the skin and will help

neutralize the oils through the alkaline content of the soap.

- Be very careful not to burn cut wood that has ivy vines attached as inhalation of the smoke from these oils can be very uncomfortable and even deadly for someone very allergic.
- Some people can develop life-threatening allergies when exposed to poisonous plants even though most people aren’t seriously endangered by them. Keep a careful eye on anyone who develops contact dermatitis from a plant and seek immediately medical help if any symptoms of a severe allergic reaction occur (shortness of breath, wheezing, difficulty swallowing). Most allergic reactions occur within twenty-four hours of exposure.

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Chapter 16

PLANT MEDICINE FOR THE WOODSMAN

“You know what they call alternative medicine that’s been proved to work? Medicine.”

—TIM MINCHIN

Sometimes the easiest and best medicine to find and use in the wilderness is the one growing at your feet. For thousands of years, people have used herbal remedies to deal with injuries and illnesses. With some education, you can learn this lore.

When considering the common ailments of the traveler in the woods, we are not looking to cure or treat serious disease, we are looking to aid our comfort level from common injury and sickness such as a shallow cut, sore throat, or upset stomach. This is where understanding simple plant and tree medicines can come in handy.

To get started in herbalism, you should understand that in an emergency situation, the best herb you can have is the one you have at hand. You must get creative with application and use, and you must be proactive in picking herbs as you see them in your outdoor excursions, before they are actually needed.

BUSHCRAFT TIP

Remember that plants are often a resource that can be used only two or three seasons out of the year, but trees are always a four-season resource. For the majority of common complaints, a tree can be found that is comparable in properties and action to most plants.

Many times plants grow in an environment that may give you a clue to their use. For example many plants that grow in moist areas are mucilaginous or slimy. Plants growing in open fields of full sun are usually dry and act as a drying-up agent. The other thing to keep in your head from the ancients is called the doctrine of signatures. According to this theory, plants may look similar to an organ of direct affinity or resemble a symbol that we are familiar with. For example, the back side of the leaf of the mullein plant greatly resembles the look of the lungs, and this plant is known far and wide to help with breathing and opening the lungs. A plant like goldenrod, which has a jagged and pointed leaf like a knife or spear, is known to be good as a styptic for stopping shallow-wound bleeding.

SELF-AID

In the bush, you are really looking for “simple.” This boils down to one ingredient or plant that will address a single symptom or condition. This is a bit counterintuitive from modern herbalism, which often relies on combinations of plants. However, it is much less complicated and allows you to use resources available on the fly. For example, if you break out in a rash and you think it is from poison ivy because you have been seeing it all day in the area you are walking, the simplest approach is just to treat the symptoms. Jewelweed has properties within the plant that are both anti-inflammatory and antihistamine. This mucilaginous plant grows in wet areas along creeks and often in areas where poison ivy is prevalent, so you can find a patch nearby and simply use the plant stems crushed for topical application. It takes just a few minutes. This simple approach will help relieve at least temporarily the major symptoms of the reaction.

TREATING BY TISSUE STATE

The woodsmen of the eighteenth, nineteenth, and early twentieth centuries could go out into the woods and find

the medicinal plants they needed to survive. We've lost much of this knowledge over the years, but the following will give you the essentials needed to treat common ailments with plants typically found throughout the Eastern Woodlands.

By learning to treat by tissue state (as described by herbalist Matthew Wood), you remove a lot of the guesswork involved in selecting treatment options so long as you can positively identify your medicinal plants.

BUSHCRAFT TIP

What are herbs? The botanical definition is a seed-bearing plant that dies back to the ground after blooming and does not have a woody stem. The other definition of herb, which is the one we will use in this chapter, is any plant or part of a plant that is used for medicine. Under this definition, herbs include leaves, flowers, buds, stems, roots, bark, berries, seeds, mushrooms, rhizomes—any plant or part of a plant that can be used for healing.

THE FIVE TISSUE STATES

The five tissue states are:

1. Dry: dry cough, first-degree burns, and abrasions
2. Cold: constipation, fungal infections
3. Wind: changing conditions of hot/cold, cramps
4. Hot: minor burns, fever, bites, blisters
5. Wet: bleeding, diarrhea, wet cough/congestion

Once you understand tissues states, you can select a plant to treat the tissue state, regardless of the specific problem. The herb can treat any of these issues—the processing of that herb is really all that will change.

HERBAL PROPERTIES

Please note that you should not go around tasting plants that you cannot readily identify. When you begin to study plants and learn to identify them, it helps greatly to find a

local expert you can work with. If one is not available, all is not lost. You can learn on your own, but you should follow a few simple rules.

Get at least three references that show the plant in detail and have a good description of not only the plant itself but also where and how it grows. Photos of it in different parts of its life cycle will be very helpful. When it comes to trees, be sure to get a book that shows details of the bark, nuts, and fruit as well. Take your books to the field and start exploring.

BUSHCRAFT TIP

One acronym I learned from a man they call Green Dean is ITEM:

- I = Identity: Identify the plant with several references.
- T = Time: Is the plant growing, blooming, fruiting in the proper time of year?
- E = Environment: Is the plant growing in the proper environment?
- M = Method: Use the proper method of harvest and preparation.

Understanding herbal properties will allow you to understand how to apply a medicinal plant to a specific tissue state. For example, different plants have different taste properties that will treat a specific tissue state:

1. Mucilaginous: sticky, slimy—used for lubrication and cooling
2. Bitter: bitter flavor—used for stimulation and heating
3. Astringent: dries out the mouth, creates a pucker reflex—used for drying and restricting
4. Volatile oil: fragrant plants—used for soothing and antisepsis
5. Resin: sticky substance that hardens, such as pine sap and birch tar—used for antisepsis and as an antifungal

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PLANTS FOR DRY CONDITIONS

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SWAMP VIOLET (*Viola palustris*)

Taste: Mucilaginous

Areas found: Violets are found all over North America

Description: Blooms from the end of February to the end of April. In the Eastern Woodland variety, the flowers are a deep purple and the leaves are heart shaped, up to about 2" across, with a single leaf on each stem.

Medicinal actions: Aromatic, soothing odor, slimy feeling on the skin

Uses: It can alleviate symptoms of dry tissues, such as a dry sore throat, a dry cough, and sunburn. Aids in regulating the digestive system, such as bloating, gas, and constipation (it is mildly laxative).

See photographs section

SASSAFRAS (*Sassafras albidum*)

Taste: Root-beer flavor, spicy, and mucilaginous

Areas found: Throughout the Eastern Woodlands

Description: Sassafras is a very common tree in the Eastern Woodlands, having three different leaves: one with a single lobe, one that resembles a mitten, and another with three lobes. These trees grow erratically and will almost never be straight when mature.

Medicinal actions: Carminative, moistening, lubricating

Uses: Settling an upset stomach, relieving inflamed eyes, relief of menstrual cramps. Root bark is a blood thinner and

taken often in the spring can help cool the body over the season. A poultice of this tree's bark is great for deep bruises to help dissipate the blood. Pregnant women should not take sassafras.

See photographs section

PLANTAIN (*Plantago major*)

Taste: Moistening, fibrous, bland

Areas found: Throughout most of the United States, in disturbed soil especially

Description: There are two main species in the United States: the long- or narrowleaf plantain (*lanceolata*) and the wide-leaf species (*major*). Both have the same general uses. It grows close to the ground. The most distinguishing characteristics for identification are the large veins on the back of the leaf, and also the spike that rises when the plant goes to seed. With wide-leaf plantain, when you tear the leaf the veins contain a thread-like fiber that will becomes exposed as well.

Medicinal actions: Best used as a drawing poultice

Uses: Treats infection or venoms from under the skin, as with an insect sting, or festered splinter.

See photographs section

NETTLES (*Urtica dioica*)

Taste: Bitter

Areas found: Damp draining areas near lowlands in rich soil

Description: Grows in patches generally. It has rough leaves with stinging spines on the stem of the plant.

Medicinal actions: Diuretic, tonic, astringent, anti-allergenic, and anti-inflammatory

Uses: Nettles can be useful in cases of hay fever and allergies, as well as skin problems. If stung by nettles, you can squeeze a little of the leaf on the sting for relief.

See photographs section

CATTAIL (*Typha latifolia*)

Taste: Mucilaginous

Areas found: Generally in water edges or very damp drainages

Description: Easily identified by the large brown cob-like flower head at the top of the plant, cattail has many long green narrow leaves layered from the base of the stem.

Medicinal actions: Antiseptic, pain reliever

Uses: The jelly that grows between young leaves can be used to relieve pain and as an antiseptic. The pounded roots can be used as a poultice for burns and sores, the down can be used as a binder or dressing for wounds, and the inner juices used as topical anesthesia and antiseptic.

Other plants that can be used to treat dry conditions:

- Shepherd’s purse
- Slippery elm

See photographs section

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PLANTS FOR COLD CONDITIONS

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BONESET (*Eupatorium perfoliatum*)

Taste: Acrid (irritatingly strong)

Areas found: Damp meadows and lowlands

Description: Blooms from July to September. The distinguishing feature of this plant is that the stem appears to grow through a single opposing lance-shaped leaf. Its flowers are white but this is true of many plants; the leaf structure is the best way to identify this plant.

Medicinal actions: Warming, stimulant, laxative when taken in excess

Uses: It can help cold tissue states, such as cold, flu, mild hypothermia, and constipation. If skin tissues show decreased oxygenation (pale, gray, blue, purple tint to skin), it can be used to stimulate the person. There's an old folk term, "bone-break fever," which refers to this plant. It is well known for raising core temperature to help break a fever and fight off infection.

See photographs section

DOGWOOD (*Cornus florida* L.)

Taste: Acrid, foul

Areas found: In most areas on edges of the Eastern Woodlands

Description: Flowering dogwood has a white to pinkish flower in the summer and has a dark and heavily segregated bark. It grows very twisted and never straight. Often it will lean toward a clearing or field edge and

generally has a low crown. The berries on this tree are red, many times in clusters of four.

Medicinal actions: Warming, stimulant

Uses: Fever with chills.

See photographs section

GOLDENROD (*Solidago rugosa*)

Taste: Dry

Areas found: Open fields, roadsides

Description: Long-stemmed plant with lance-shaped leaves. Many species differ slightly, but all have a large cluster of yellow (gold) small flowers.

Medicinal actions: Astringent, antifungal, anti-inflammatory, diuretic

Uses: Goldenrod is used on the skin to heal wounds and is taken internally to reduce bloating.

See photographs section

RED CLOVER (*Trifolium pratense*)

Taste: Sweet, cooling

Areas found: Most woodland edges and fields, in disturbed areas

Description: Red clover usually has three leaves, typically shaped like a shamrock, with a red/purple color flower in season.

Medicinal actions: Male/female tonic

Uses: Used for hot flashes/flushes and PMS, as well as lowering cholesterol, improving urine production, and improving circulation of the blood, to help prevent osteoporosis, reduce the possibility of blood clots and arterial plaques, and limiting the development of benign prostate hyperplasia. Red clover is a soothing lymphatic for sore throats and coughs. It is also antispasmodic, making it useful for spasmodic coughs resulting from bronchitis. It is gentle enough to use on children.

See photographs section

CHICORY (*Cichorium intybus*)

Taste: Bitter

Areas found: Disturbed soil, especially near roadsides

Description: Chicory is a long-stemmed plant with a pale blue to purple flower that only opens in the daylight.

Medicinal actions: Tonic, laxative, diuretic, sedative

Uses: It can ease digestive problems and improve function, prevent heartburn, reduce arthritis pains, detoxify the liver and gallbladder, prevent bacterial infections, boost the immune system, and reduce the chance of heart disease. It is also a natural sedative, can protect against kidney stones, and can help you lose weight.

See photographs section

RIVER BIRCH (*Betula nigra*)

Taste: Acrid

Areas found: Wet areas; it is a water-indicator tree

Description: River birch has a white color bark on the outside, typical of birch but more red underneath and peeling in small chips, not in larger sheets like many birch.

Medicinal actions: Diuretic, antirheumatic, stimulant, astringent, anthelmintic, sweating agent

Uses: An infusion made from the leaves of the birch can be used as a diuretic and cleansing agent to the urinary tract. In addition, it has been used to treat gout, rheumatism, and mild arthritic pain.

Other plants for cold tissue states:

- Shepherd's purse
- Mustard
- Horseradish
- Alfalfa

See photographs section

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PLANTS FOR WIND CONDITIONS

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MULLEIN (*Verbascum densiflorum*)

Taste: Flowers are sweet, leaves are bitter

Areas found: Throughout North America in areas characterized by gravel, sand, or chalk

Description: It flowers during July and August. The leaves are often described as lamb's ears; they are soft and furry, slightly delicate-feeling, although they are quite strong. A pale green to gray-green color is normal, with a second-year stalk bearing yellow flowers rising from the center rosette to more than 6".

Medicinal actions: Anti-inflammatory, antibacterial, absorbent (when using raw leaves)

Uses: It can be used for wind conditions, such as chest colds, tension in the chest, sudden changes endured in body temperature (such as a submersion incident), chills, and joint pain. It can help treat gas and bloating that comes and goes suddenly as well as nausea and vomiting. The leaves of the mullein make good natural gauze and absorb blood well. It is fantastic as a wound dressing due to its inherent antibacterial properties. Mullein can serve as a sanitary pad and toilet paper.

PRACTICAL SCENARIO
A fifty-eight-year-old man has a head cold that seemed to be getting better. Suddenly the symptoms have gotten worse. He is having unstoppable coughing jags. He can't sleep because of the coughing and feels miserable. What should you do?
ANSWER
Administer mullein with boneset (about equal parts) in a tea, taken as needed to relieve symptoms. After a good night's rest, it is likely that the affected individual will wake up on the path to improvement.

See photographs section

BLACK WILLOW (*Salix nigra*)

Taste: Acrid

Areas found: Generally a water-indicator tree and found in moist soil areas and water-holding depressions

Description: This tree often leans. It has deeply furrowed gray bark and plentiful lance-shaped leaves with fine-toothed jagged edges.

Medicinal actions: Analgesic, anti-inflammatory, appetite depressant, astringent

Uses: Willow bark acts a lot like aspirin, so it is used for pain, including headache, muscle pain, and menstrual cramps. Willow bark is also used for fever, the common cold, flu, and weight loss.

See photographs section

WHITE WILLOW (*Salix alba*)

Taste: Acrid

Areas found: Generally a water-indicator tree, and found in moist soil areas and water-holding depressions

Description: The white willow is similar in appearance to the black willow except its leaves have a fine white fur-like growth that is predominant on the underside.

Medicinal actions: Antifever, pain reliever, anti-inflammatory

Uses: White willow reduces inflammation and fever, and it is a mild pain reliever. It is useful for gout, back pain, and

arthritis.

See photographs section

TULIP POPLAR (*Liriodendron tulipifera*)

Taste: Intensely acrid

Areas found: Throughout the Eastern Woodlands

Description: Tulip poplar is a very tall tree, usually the tallest in a canopy line looking from afar. Generally the branches will fall off and die below the canopy level making for a long, straight grayish trunk with obvious eye-shaped scars where branches have dropped. When turned upside down the leaf of this tree looks a bit like a nightshirt—hence the folk name mother-in-law's shirt.

Medicinal actions: Astringent, warming

Uses: The inner bark of the roots is used as a diuretic, tonic, and stimulant. A tea is used to treat gastrointestinal problems, rheumatism, coughs, and fevers. Externally, the tea is used as a wash and a poultice on wounds and boils.

Other plants for wind tissue states:

- Valerian
- Chamomile
- Wild lettuce
- Blessed thistle

See photographs section

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PLANTS FOR HOT CONDITIONS

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CURLY DOCK, A.K.A. YELLOW DOCK (*Rumex crispus*)

Taste: Sour

Areas found: Edges of woodlands, pastures

Description: This plant is easily distinguished in two seasons: In the summer, the leaves are long and lance-shaped and twist in a curl, giving it the nickname curly dock. The leaves are dark green and fairly rough with a red vein in the center. In the late summer it is one of the first plants to turn almost completely dark brown.

Medicinal actions: Anti-inflammatory, with warming properties that drive fluids to the skin's surface for cooling effects

Uses: It can be used to treat mild hyperthermia, swelling, and inflammation. It can reduce tenderness associated with autoimmune disorders.

See photographs section

HONEYSUCKLE (*Lonicera*)

Taste: Sweet

Areas found: Often invasive and climbing among trees and low shrubs in areas at the edge of fields and older roads

Description: There are around twenty types of honeysuckle in North America. Whether it is the shrub or the climbing-vine variety, honeysuckle is easily recognized by its fragrant, trumpet-shaped flowers, which bloom in an array of colors, from white to yellow to red. When not in

bloom honeysuckle bears bright-colored berries that attract various birds.

Medicinal actions: Antibacterial, anti-inflammatory, antispasmodic, diuretic, fever reducer

Uses: A decoction of honeysuckle stems is used internally in the treatment of acute rheumatoid arthritis, mumps, and hepatitis. Honeysuckle stems and flowers are used together as a medicinal infusion in the treatment of upper respiratory tract infections (including pneumonia) and dysentery. It can be used internally and externally to treat any inflammation.

See photographs section

BLACK CHERRY (*Prunus serotina*)

Taste: Bitter, sweet, sour

Areas found: Hardwood areas of the Eastern Woodlands

Description: Fairly large tree with bark that peels and is red underneath. The outer bark is usually a dark gray.

Medicinal actions: Astringent

Uses: The root bark and inner bark can be used in infusions (not boiled) to treat diarrhea, fever, coughs, colds, and sore throats.

See photographs section

WOOD SORREL (*Oxalis stricta*)

Taste: Cooling, sour

Areas found: Field edges

Description: Leaves are clover-like with yellow flowers.

Medicinal actions: Cooling, tonic, anti-inflammatory

Uses: Decoctions are used to relieve hemorrhages and urinary disorders. Cloths soaked with juice and applied to the skin are effective in the reduction of swellings and inflammation. Don’t overuse wood sorrel internally.

Other plants for hot tissue states:

- Hawthorn
- Sheep sorrel
- Garden sorrel
- Lavender

See photographs section

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PLANTS FOR WET CONDITIONS

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BLACK RASPBERRY (*Rubus occidentalis*)

Taste: Fruit is sweet, tart, sour; leaves a bit less but still citrus

Areas found: Eastern Woodlands

Description: A very common woodland plant, it grows in thickets and is covered in thorns. The fruit can be bright red to almost black depending on ripeness, and the leaves are generally in clusters of three at the end of each branch. This plant, like many others, will most often be found on edges of fields and clearings.

Medicinal actions: Carminative, antispasmodic, antidiuretic, astringent

Uses: Alleviates menstrual cramps, diarrhea, colds, and stomach complaints. Raspberry tea can reduce fever.

See photographs section

YARROW (*Achillea millefolium*)

Taste: Astringent

Areas found: Everywhere, along roadways, paths, meadows, pastures

Description: It blooms from June to September. This plant is fairly easily identified in the summer when blooming as it has a white flower top with many small flowers, creating a doily-looking flower head. The leaves are similar to fine feathers. However, it can be confused with Queen Anne's lace and hemlock so correct identification is imperative

with this species. This is one of the most-used plants due to its blood-clotting capabilities as well as work on fevers.

Medicinal actions: Diaphoretic (a substance that induces sweating), astringent, tonic, stimulant, and mild aromatic

Uses: It can be used to treat deep lacerations, bleeding, severe colds, and flu. It induces perspiration and is a mild stimulant.

See photographs section

WHITE OAK (*Quercus alba*)

Taste: Acorns can be sweet

Areas found: Common in eastern and central North America

Description: White oak leaves lack the points on the lobes that are indicative of a red oak species. You can also cut into the cambium layer of bark and it will be white or red.

Medicinal actions: Astringent

Uses: The ground bark or the meat from an acorn is heavily astringent for minor bleeding, but the white oak has been traditionally used for any wet tissue state externally as well as internally from the neck up or within the digestive tract.

See photographs section

BURDOCK (*Arctium*)

Taste: Dry

Areas found: Near older homesteads, and roadsides, especially many back roads; disturbed soil

Description: Large-leaf plant that can be mistaken for rhubarb. Identify by the spike in the center with many attached burrs in the stem.

Medicinal actions: Traditionally used to clear toxins from the bloodstream

Uses: Used externally, it can relieve skin problems such as eczema, acne, and psoriasis. Taken internally, it helps eliminate excess water. Pregnant or nursing women should not take burdock.

See photographs section

HEAL ALL, A.K.A. WOUNDWORT (*Prunella vulgaris*)

Taste: Dry

Areas found: Open field edges and open fields, sometimes near thickets

Description: Smaller plant that grows in clusters, it has few leaves but a longer squarish stem. Top resembles a cone with many small blue-purple flowers in season.

Medicinal actions: Cooling, antiseptic, immune system balance

Uses: Externally, used for healing wounds and sores. Internally, used to relieve eye inflammation and eyestrain, to treat digestive tract problems, and to relieve headaches and sore throats.

See photographs section

JEWELWEED (*Impatiens capensis*)

Taste: Not edible

Areas found: Wet drainages and creek beds

Description: Grows in large patches, has a hollow stem that contains some liquid. Nodules grow at each intersection; flowers are orange when blooming.

Medicinal actions: Anti-inflammatory, antihistamine

Uses: Jewelweed contains a compound called lawsone in its leaves, which has been proven to have antihistamine and anti-inflammatory properties when used as a salve.

See photographs section

BLACK WALNUT (*Juglans nigra*)

Taste: Acrid

Areas found: Wood lines within fields and along roadways, especially in old settled areas

Description: Large tree generally appears in poor health in the winter months. Heavily furrowed bark, many lance-shaped leaves. Pith of stem and tree are brown, and it bears a green-hulled nut in season.

Medicinal actions: Astringent, antiseptic, vermifuge (for treating intestinal parasites)

Uses: It oxygenates the blood, killing parasites. It can balance sugar levels and burn up excessive toxins and fatty materials. The juice from the fruit husk is applied externally as a treatment for ringworm. An infusion of the bark can be used to treat diarrhea.

See photographs section

STAGHORN SUMAC (*Rhus typhina*)

Taste: Tart

Areas found: Throughout the Eastern Woodlands especially in wood lines near clearing and disturbed agricultural areas

Description: A smaller tree, it bears a red fruit in a large cluster during bloom. The bark has a milky sap when cut.

Medicinal actions: Cooling, antiseptic, astringent, styptic

Uses: An infusion of sumac bark or roots is antiseptic, astringent, and diuretic. It is used for the treatment of colds, diarrhea, fevers, general debility, to increase the flow of breast milk, to treat sore mouths and throats, rectal bleeding, inflammation of the bladder and painful urination, retention of urine and dysentery, and is applied externally to treat excessive vaginal discharge, burns, and skin eruptions.

See photographs section

WHITE PINE (*Pinus strobus*)

Taste: Pungent, warm

Areas found: Throughout the Eastern Woodlands in sandy soils

Description: The easiest way to identify white pine is by its clusters of five needles.

Medicinal actions: Antibacterial, antifungal

Uses: Of all the trees that produce medicine, perhaps the most versatile is the white pine. Nearly every part of it serves a medicinal purpose. The needles, which can be easily made into an herbal tea, provide high amounts of vitamin C to strengthen the immune system. The sap,

frequently referred to as pitch or resin, is both antibacterial and antifungal; it also works well to stop bleeding, seal wounds, and draw out things that shouldn't be there such as pus or splinters. The inner bark contains natural oils and resins that have antiseptic and expectorant qualities. *Note*: Avoid infusions of long-needled pine species.

See photographs section

DANDELION (*Taraxacum officinale*)

Taste: Bitter

Areas found: Open fields, and beaten pathways, in full sun generally, common yard plant

Description: Wide green leaves in a ground rosette; sometimes also grows in clusters; long hollow stem with yellow flower in season.

Medicinal actions: Diuretic, anti-inflammatory, tonic

Uses: Dandelion is used to treat kidney and urinary disorders and as a diuretic. It can also be used for eczema and acne.

See photographs section

WILD GARLIC (*Allium vineale*)

Taste: Aromatic, pungent

Areas found: Fields especially in agricultural areas, and woodland edges

Description: Similar to an onion with a multiple-lobed bulb underground and thin, long green stems above with a white flower in season.

Medicinal actions: Antiasthmatic, carminative, diuretic, expectorant, hypotensive, stimulant, and vasodilator

Uses: The raw root can be eaten to reduce blood pressure and also to ease shortness of breath.

Other medicinal plants for wet conditions:

- Chickweed

BUSHCRAFT TIP

Honey is a versatile natural substance that can help treat many common problems from minor burns to skin wounds to infections. Keep raw honey on hand for quick and handy first aid (plus it tastes great on campfire biscuits!).

See photographs section

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OPOSSUM MENTALITY REGARDING MEDICINAL PLANTS

In the Pathfinder System, there is a concept we refer to as “Opossum Mentality,” which means, when you see it grab it for later use. In a wilderness emergency situation, the best herb you can have is the one you have at hand. The more you learn to identify medicinal plants, the better prepared you will be to pick them up as you walk around in the wild. The more varieties you pick, the more treatment options you will have should you need to rely on their medicinal properties. So, train yourself to pick up medicinal herbs and wild foods as you see them just as you would collect fire-making materials for the next fire.

PROCESSING HERBS FOR MEDICINAL USE

Herbs can be prepared in different ways to fully access their various healing properties. Here are some of the most common methods of processing herbs.

Poultice: Ground, masticated, or shredded herbs usually moistened and packed over the skin and then wrapped to keep in place. Poultices are used to relieve soreness and inflammation.

Hot infusion: An infusion uses water, oil, or alcohol to extract chemical compounds from plants. For a hot infusion, use hot solvents. Generally the water (or oil or alcohol) is heated and poured over the plant material, then left to steep for about fifteen minutes. (Decoctions are used for roots and barks, infusions for leaves and flowering tops.)

Cold infusion: Cold infusions are used for herbs that lose their effectiveness when exposed to heat, such as peppermint, sumac, lemon, and lemon balm. Cold infusions are used to gain a cooling action. Cold (even frozen) solvents are used.

Decoction: For harder-to-extract herbs such as roots and bark, decoction is used to concentrate the active ingredient of a plant by heating or boiling it.

Tincture: An herb preserved in liquid, generally vodka/brandy or glycerin.

Fomentations: Cloth dipped in a decoction or infusion and applied to the skin.

Salves: The mixture of an oil with the herb plus beeswax. These are used for topical/external applications and can protect the skin while helping to heal a wound.

Crushed application: Some herbs can be used straight from the plant with little preparation beyond crushing them to release their juices.

PREPARING A FRESH-HERB POULTICE

If using fresh herbs for your poultice, place 2 ounces of chopped or bruised herbs—about 1/2 cup—and a cup of water in a small saucepan. Simmer for 2 minutes. Do not drain. Arrange a clean piece of gauze, muslin, linen, or white cotton sheet on a clean, flat surface. The material should be large enough to cover the affected area completely (but do not place on the affected area yet). Remove the hot herbs from the saucepan. When cool enough to be placed on skin and not scald, place the hot herbs directly on the skin you are treating. Then pour the herbal solution over the cloth and place the cloth over the

herbs that are on the skin. Wrap a towel around the poultice to prevent the soiling of clothes.

Hot poultices are best for superficial wounds. The heat helps to draw blood to the surface, opens the pores, and assists in the assimilation of the herbs through the skin. This is great for wet and unproductive coughs.

Cold poultices are best for deep wounds, such as contusions, bruises, and fractures. The affected area will usually feel hot to touch and so the cold poultice (made either by preparing herbs with cold water, or by cooling a previously prepared one) will act as an analgesic, helping to draw the beneficial effects of the herbs down deep into the tissue.

Herbal poultices should be kept in place for one to twenty-four hours, or as needed. During this period, you may experience a throbbing pain as the poultice draws out infection and neutralizes toxins. When the pain subsides, you will know that the poultice has accomplished its task and should be removed. Apply fresh poultices as needed until the desired level of healing has been reached.

HOT INFUSION (HOT TEA)

1. Shred 8 ounces fresh herbs (4 ounces dried) and place in pitcher or bowl. Boil 1 quart water in bush pot. Pour the boiling water over the fresh shredded herbs.
2. Cover the brew and remove from the heat.
3. Let it steep for 5–15 minutes. Generally an infusion made from roots or bark should be left to steep longer than those made from flowers or leaves. If fresh plants are used, it tends to infuse much faster compared to dried plants.
4. After steeping the herbal tea for the appropriate amount of time, filter out the liquid. Drink 8 ounces every 1–2 hours until gone.

DECOCTION

1. Pour the required amount of water into a container and bring the water to a boil. Generally use about 1 cup of water.
2. Add in the required amount of the plant parts. Use 2–4 tablespoons of fresh herbs. Continue simmering over low heat for 15–30 minutes.
3. Remove from heat and let the brew stand for a few minutes.
4. Strain the liquid out while it is still hot. Drink 8 ounces every 1–2 hours.

COLD INFUSION

Cold infusions are made like a sun tea, with cold water poured over the herb and then left in the sun to steep. They take longer than hot infusions to pull the good stuff from the plant matter but also have certain advantages in cases where heat could damage some of the constituents of the plant.

TINCTURE

Tinctures, although not practical for on-the-trail preparations, are an inexpensive and potent way to preserve and use medicinal herbs. Although the quantities of vodka/brandy vary, most herbal tinctures are very easy to make and will last for years at full potency. If you desire to use wild picked or store-bought dried herbs for your family's health needs, tincturing is worth learning as it will provide you inexpensive, fast-acting remedies with less work than tea.

A simple alcohol tincture is made by using at least 90 proof liquor of any kind. Stuff a dark bottle or jar with plant materials, then add liquor to the top and seal. Store in a dark place for approximately two weeks, shaking the

contents every day for the first week. Then strain and use in drops as a medicinal preparation.

FOMENTATIONS

Dip a cloth or towel in a warm infusion or decoction, wring it out, and apply locally to the affected body part. Cover the cloth with a dry towel to help retain the heat. These herbal preparations are used to treat headaches, chest congestion, skin irritations, and swelling due to an injury. They can be used hot or cold. Use cold compresses where the skin is broken or feels flushed. Use hot compresses when the skin is not broken and/or circulation needs to be brought to the area.

As with herbal poultices, fomentations should be kept in place for one to twenty-four hours, or as needed, and again, you may experience a throbbing pain as the fomentation draws out infection and neutralizes toxins. When the pain subsides, you will know that the fomentation has accomplished its task and should be removed. Apply fresh fomentations as needed until the desired level of healing has been reached.

SALVES

Salves can be made in many ways, but the simplest method is to use a combination of olive oil or another carrier oil and beeswax. Then add the herb and let simmer for about 20 minutes. A simple way to check the consistency is to spoon out a bit of liquid and allow it to cool. It should be solid but creamy, like petroleum jelly. You can make the salve wetter or dryer, according to your personal preference, by adjusting the amount of oil and beeswax you use and by adjusting the simmer time. When satisfied with the consistency, remove it from the heat and let cool. Store in a tin or small, wide-mouthed glass container.

COMMON CONDITIONS AND THEIR TREATMENTS	
CONDITION	**TREATMENT**
Bleeding	White oak bark (poultice); black walnut (powder)
Breaks, sprains, strains	White oak (fomentation, cool)
Bites, stings	Charcoal poultice (must be kept warm)
Blisters	Plantain salve
Burns	Honey; plantain salve (do not use either on severe burns)
Constipation	Black walnut (mild decoction)
Diarrhea	White oak (strong decoction); white or black willow (strong decoction); black walnut (mild decoction)
Stomach upset (possible poison)	Charcoal (purgative: mix 1 teaspoon with 4 ounces water)
Stomach upset (gas, cramps, indigestion)	Charcoal ($^1/_2$ teaspoon with 12 ounces water)
Immune system	Honey (1 teaspoon 3 times per day)
Sore throat	White oak bark (mild decoction); black walnut (mild decoction)
Cough	White oak bark (strong decoction)
Sleeplessness	White or black willow (strong decoction)
Headache	White or black willow (mild decoction)
Fever	White or black willow bark (strong decoction)
Minor abrasions	Honey (use as ointment); plantain salve
Toothache, mouth sores	Honey; white oak bark (strong decoction); sea salt (1 teaspoon per 4 ounces water; use as mouthwash)
PMS	Willow (decoction)
UTI	White oak (mild decoction); black walnut (strong decoction)
Antiparasitic (bad water)	Black walnut (strong decoction: 50/50 leaves/hulls, if possible)
Fight or flight	White or black willow (mild decoction)
Contact dermatitis	Black walnut (mild decoction, fomentation); charcoal (poultice on irruptions)
Electrolytes imbalance	Honey and sea salt (1 teaspoon honey and $^1/_8$ teaspoon sea salt dissolved in 8 ounces water)

TIPS AND TRICKS

- Remember that most plants that are medicine are also food, or at least edible, so if you don’t have time for a preparation to be taken internally, just eat the plant.
- A spit poultice is a quick way to use a topical medicinal. Just chew the plant and mix with saliva, then pack over the affected area and bandage.
- An infusion can always be used as a wash to help speed healing.

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Appendix 1

LEGAL AND ETHICAL CONSIDERATIONS

The most important task of rescuers is to rescue. What you've learned in this book are techniques that will help injured people in the wild (as well as you) and quite possibly save lives. That said, things don't always go according to the book. When helping an injured person, you may commit a mistake, possibly even one that does additional harm. Unfortunately, in today's litigious society, you may get sued.

What should you do? The easiest thing would be to back off and offer no help. But this would be profoundly wrong. Your first instinct, to help the injured or ill person, is the right one. Be aware that each state has different laws regarding the administration of first aid and what legal obligations you may have.

The Wilderness Medical Society has developed a set of legal principles for emergency care to help you decide what to do. In general, legally you don't have to help a stranger unless you have a business relationship with him or are in a position where it is expected that you will give aid. For example, a park ranger would be expected to render first aid. So, too, would a wilderness group leader if someone in the party is hurt. When the injured person is not a stranger or if you helped create the dangerous situation, you are

generally expected to give aid. For example, a parent would be expected to help his child. If you accidentally drove your ATV over someone's foot, you'd be expected to help as well.

No one expects you to have the same level of first-aid skills as a medical professional; if you feel that a situation is beyond your abilities, work to evacuate the patient as quickly as possible so that he can receive professional assistance. Never accept money in return for care, as this violates most Good Samaritan laws designed to protect aid givers.

In many situations, the factor that caused the injury continues to endanger all those in the area. You should never put the health and safety of the victim above your own. However, once you've begun to help someone, you must remain there until relieved by someone with the same or greater level of first-aid skills. If helping an injured or ill person would risk your own life or safety, you are not expected to help.

If the injured person is alert, treat him as a partner in his own care. Ask if it's okay for you to help. Be calm, rational, and if he objects, tell him why what you're suggesting is the best course. If he's confused (which, depending on the injury, he may well be) or could hurt himself further by his actions, you're permitted to help. If the injured person is unresponsive, it is assumed that he would consent to treatment and so you may act.

Since you want to gain his confidence, start by explaining who you are and how much training you've had in first aid. Always tell him why you're doing what you're doing ("I'm splinting your leg to immobilize it until we can get you to a doctor").

In short, the law doesn't compel you to help someone who's ill or injured in the wilderness. But if you're a good person, and we assume you are, you'll feel obliged to use what you've learned from this book to help.

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Appendix 2

CREATING FIRST-AID KITS

If you're planning a wilderness trip, you may want to devise a first-aid kit for use in the event of an accident or illness. The tools and supplies can be customized for your needs—for example, a first-aid kit can be designed for self-aid or for group camp use. Requirements will differ depending on group size, trip length, remoteness of location, and your individual or group medical qualifications, but these should serve as a solid foundation from which to build.

SELF-AID KIT

Generally, we rely heavily on the Ten Cs as the basis for improvised self-aid supplemented by simple over-the-counter pain relievers and herbal medicines and medicinal salves. Thus, our recommended self-aid kit would include:

- ❑ Cutting tools (knife, axe, saw)
- ❑ Combustion devices (fire-starting tools)
- ❑ Cover elements (clothing, tarps, tents)
- ❑ Cordage (bank line and paracord)
- ❑ Containers (32-ounce stainless steel bottle at minimum)
- ❑ Compass (with mirror and built-in magnification lens)
- ❑ Cargo tape (Gorilla Tape)

- ❑ Candling device (headlamp with spare batteries)
- ❑ Cloth (3' × 3' of cotton cloth)
- ❑ Canvas needle (for equipment repairs)
- ❑ Woodsman’s apothecary
  - ❑ Acetaminophen
  - ❑ Ibuprofen
  - ❑ Diphenhydramine (antihistamine)
  - ❑ Camp wax
  - ❑ Nitrile gloves

BUSHCRAFT TIP

If firearms will be involved in your trip, consider including a tactical first-aid kit:

- ❑ Tourniquets
- ❑ Chest seals
- ❑ Duct tape
- ❑ Nitrile gloves
- ❑ Quick clot
- ❑ Steri-Strips
- ❑ Dermabond or Vetbond

BASE CAMP FIRST-AID KIT

This kit design is for the needs of multiple people within the same group. Trained responders may wish to substitute elements to better suit their needs according to their level of training.

- ❑ Protect any sterile dressings within your kit from moisture by sealing them in 1-gallon freezer bags in groups of four.
- ❑ Your kit should always be easily accessible and its location known by everyone in your group.
- ❑ A designated person, typically the one with the most training, should be appointed medical person in charge.

- ❑ Label all containers clearly and include instructions in case the medical person in charge is the one who becomes injured.
- ❑ Splints can be improvised in the field from natural material or foam sleeping pads. So only include SAM splints if you have space or the desire to carry them.

BANDAGES AND DRESSINGS

- ❑ 4" × 4" gauze pads
- ❑ 2" × 2" gauze pads
- ❑ 3" gauze roller bandage
- ❑ Paper tape
- ❑ Elastic roller bandage
- ❑ Self-adhering bandage
- ❑ Cravat
- ❑ Adhesive bandages (various sizes)
- ❑ Steri-Strips or butterfly bandages
- ❑ Wound irrigation syringe
- ❑ $1^1/_2$" athletic tape
- ❑ 2nd Skin
- ❑ Moleskin

OINTMENTS AND MEDICATIONS

- ❑ Povidone iodine
- ❑ Triple antibiotic cream
- ❑ Cortizone cream
- ❑ Aspirin
- ❑ Ibuprofen
- ❑ Acetaminophen
- ❑ Diphenhydramine (antihistamine)
- ❑ Hydration salts/Jell-O

TOOLS

- ❑ Bandage scissors/EMT shears

- ❑ Thermometer with hard case
- ❑ Tweezers
- ❑ Nitrile gloves
- ❑ Sawyer Extractor
- ❑ Notepad and pencil
- ❑ Small multitool or Swiss Army knife
- ❑ Emergency space blanket
- ❑ Safety glasses and face shield

AIRWAY DEVICES

- ❑ CPR mask
- ❑ Nasopharyngeal airway

SIGNAL DEVICES

- ❑ Signal mirror
- ❑ Road flare
- ❑ Headlamp and batteries

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PLANTS FOR DRY CONDITIONS

Swamp Violet (*Viola palustris*)

Alleviates symptoms of dry tissues, aids digestion

Sassafras (*Sassafras albidum*)

Carminative, moistening, lubricating

Plantain (*Plantago major*)

Treats infection

Nettles (*Urtica dioica*)

Diuretic, tonic, astringent, anti-allergenic, anti-inflammatory

Cattail (*Typha latifolia*)
Antiseptic, pain reliever

PLANTS FOR COLD CONDITIONS

Boneset (*Eupatorium perfoliatum*)

Helps with cold, flu, mild hypothermia, constipation

Dogwood (*Cornus florida* L.)

Warming, stimulant

Goldenrod (*Solidago rugosa*)

Astringent, antifungal, anti-inflammatory, diuretic

Red Clover (*Trifolium pratense*)

Male and female tonic

Chicory (*Cichorium intybus*)

Tonic, laxative, diuretic, sedative

River Birch (*Betula nigra*)

Diuretic, antirheumatic, stimulant, astringent

PLANTS FOR WIND CONDITIONS

Mullein (*Verbascum densiflorum*)

Anti-inflammatory, antibacterial, absorbent

Black Willow (*Salix nigra*)

Analgesic, anti-inflammatory, appetite depressant, astringent

White Willow (*Salix alba*)

Antifever, pain reliever, anti-inflammatory

Tulip Poplar (*Liriodendron tulipifera*)

Astringent, warming

PLANTS FOR HOT CONDITIONS

Curly Dock, a.k.a. Yellow Dock (*Rumex crispus*)

Anti-inflammatory, cooling effects

Honeysuckle (*Lonicera*)

Antibacterial, anti-inflammatory, antispasmodic, diuretic

Black Cherry (*Prunus serotina*)

Astringent

Wood Sorrel (*Oxalis stricta*)

Cooling, tonic, anti-inflammatory

PLANTS FOR WET CONDITIONS

Black Raspberry (*Rubus occidentalis*)

Carminative, antispasmodic, antidiuretic, astringent

Yarrow (*Achillea millefolium*)

Diaphoretic, astringent, tonic, stimulant

White Oak (*Quercus alba*)

Astringent

Burdock (*Arctium*)

Detoxifier

Heal All, a.k.a. Woundwort (*Prunella vulgaris*)

Cooling, antiseptic, immune system balance

Jewelweed (*Impatiens capensis*)

Anti-inflammatory, antihistamine

Black Walnut (*Juglans nigra*)

Astringent, antiseptic, vermifuge

Staghorn Sumac (*Rhus typhina*)

Cooling, antiseptic, astringent, styptic

White Pine (*Pinus strobus*)
Antibacterial, antifungal

Dandelion (*Taraxacum officinale*)

Diuretic, anti-inflammatory, tonic

Wild Garlic (*Allium vineale*)

Antiasthmatic, carminative, diuretic, expectorant, hypotensive, stimulant, vasodilator

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